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NUMBER 4

A GUIDE TO THE MOSQUITO LARVAE OF WESTERN CANADA¹

By J. G. REMPEL

Abstract

Keys to the genera and species of mosquito larvae of the four western provinces of Canada are presented. To facilitate identification the generic and specific characters used in the keys are fully illustrated. A map of Western Canada showing the main vegetation zones and the principal areas of intensive mosquito collecting is included. Six genera and 46 species are represented in the mosquito fauna of Western Canada, namely *Anopheles* with four species, *Mansonia* with one species, *Wyeomyia* with one species, *Culiseta* with five species, *Culex* with four species, and *Aedes* with 31 species.

In recent years mosquitoes have assumed great importance because of their capacity to transmit disease and their habits of attack resulting in much discomfort. Although disease transmission by mosquitoes has not assumed major importance in Western Canada, the presence of unusually large numbers during most of a short summer season places them in a special category. This is particularly true in the far northern areas. In the Canadian northwest hordes of mosquitoes can make life at times almost unbearable.

Although in recent years mosquitoes have been the subject of special studies and a great deal of information has been accumulated, there is still surprisingly much to be learned. Further studies of the habits of breeding, feeding, and flight of our species are in order before extensive control measures are attempted. Needless to say such studies must be built on sound taxonomic investigations.

Identification of mosquitoes is by no means an easy task. The females of our "black-legged" mosquitoes show much uniformity and useful characters for separation are few. Moreover, these characters are usually lost in rubbed specimens. The male genitalia are most useful in taxonomic studies, but males are short-lived and not readily collected. Fortunately the larvae display characters that permit specific determination. In all studies of mosquitoes it is thus essential that an effort be made to secure larvae. Since rearing is comparatively easy in the case of mosquitoes, this has the added advantage in enabling one to secure males and unrubbed females.

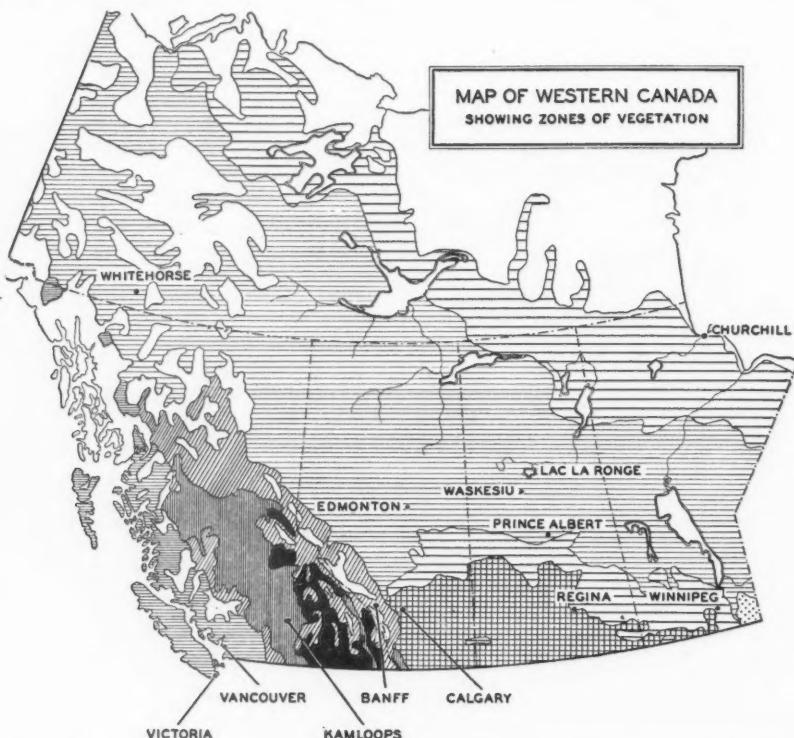
The present paper has been prepared with a view to facilitate the identification of the mosquito larvae of the Canadian West. Only species definitely known to occur in the area are included in the key. The emphasis has been on illustration and all description is kept to a minimum.

¹ Manuscript received January 25, 1950.

Contribution from the University of Saskatchewan, Saskatoon, Sask.

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Since this is a guide to the taxonomy of the group, data regarding life histories, feeding and breeding habits, etc., have been omitted. Distributional data, although limited, are presented, for they may aid in the identification. A map of Western Canada showing the main vegetation zones and the principal areas of intensive collecting is included.



REGION	PRINCIPAL SPECIES
GREAT LAKES, ST. LAWRENCE	PINE, SPRUCE, YELLOW BIRCH, MAPLE
BOREAL	SPRUCE, BALSAM, WHITE BIRCH, POPLAR, JACKPINE
SUBALPINE	ENGELMANN SPRUCE, LODGEPOLE PINE
COLUMBIA	ENG. SPRUCE, DOUGLAS FIR, CEDAR, HEMLOCK, LARCH
MONTANE	MONTEREY, PONDEROSA AND LODGEPOLE PINES, SPRUCE, DOUGLAS FIR
COAST	DOUGLAS FIR, CEDAR, HEMLOCK, SITKA SPRUCE
GRASSLAND	
ALPINE AND ARCTIC TUNDRA	

Map of Western Canada showing zones of vegetation.

In the taxonomy the writer has followed Matheson, whose book on mosquitoes is in general use in America. It must, however, be pointed out that the larvae of some species show considerable variation. Hence the statements

in the key refer to general tendencies rather than to absolute conditions. If the student will keep this in mind, much discouragement will be avoided.

KEY TO GENERA

1. Air tube present.....
Air tube absent; Fig. 1 B.....*Anopheles* 2
2. Air tube short, apex modified to penetrate plant tissues; Fig. 3 B.....*Mansonia*
Air tube long, adapted to pierce surface water film..... 3
3. Air tube without pecten; ventral brush of anal segment a tuft of three hairs on either side of the median line; air tube with numerous simple hairs; Fig. 4 B (larvae found in pitcher plant).....*Wyeomyia*
Air tube with pecten; ventral brush well developed..... 4
4. Siphonal tufts at base of air tube; lower tufts of dorsal brush each a branched hair; Fig. 5 B.....*Culiseta*
Siphonal tufts some distance from base of air tube, usually beyond pecten; lower tufts of dorsal brush each a single hair..... 5
5. Only one pair of ventral siphonal tufts, usually located beyond pecten; if more than one pair of tufts then additional ones are found laterally and dorsally on air tube; anal segment usually not ringed by the dorsal plate; Figs. 14 B and 20 B.....*Aedes*
Several pairs of ventral siphonal tufts, some of which may be long single hairs; anal segment ringed by the dorsal plate; Fig. 12 B.....*Culex*

Anopheles Meigen

The *Anopheles* larvae are readily separated from all other mosquito larvae by their spiracular apparatus. The siphon is absent and the spiracular openings are located directly on the dorsal surface of the eighth abdominal segment (11).

The anopheline mosquitoes, although widespread in Canada, are never abundant in the manner of the dominant culicine species (12). In many localities they are rare or absent. Only one species, *Anopheles occidentalis* Dyar and Knab, has a range that probably extends over the whole of Western Canada. This is the only anopheline species found in Saskatchewan and in Alberta. *A. punctipennis* Say and *A. walkeri* Theo. are found in Manitoba and British Columbia while *A. freeborni* Aitken is restricted to British Columbia.

KEY TO SPECIES

1. Inner clypeal hairs (No. 2) branched; Fig. 1 A.....*A. occidentalis* D. & K.
Inner clypeal hairs not branched..... 2
2. Inner clypeal hairs with minute feathering near the tip; Fig. 2 A.....*A. walkeri* Theo.
Inner clypeal hairs simple; Fig. 2B.....*A. punctipennis* Say
A. freeborni Aitken

Anopheles occidentalis Dyar and Knab

Fig. 1

Description

Antenna spinous; tuft (11) located on basal third, branched. Inner clypeal hairs (2) branched, arising from tubercles placed close together; outer clypeals (3) densely branched, fan-shaped; posterior clypeals (4) four-branched; frontals (5, 6, 7) long, plumose.

Distribution

This is the only common anopheline mosquito in Western Canada. The species is rare on the open plains, but fairly common in the northern wooded areas. The writer has collected numerous larvae and adults at Waskesiu, where the species breeds along the shore of a sluggish overgrown stream. The larvae are not common until late July. The species is northern in distribution, its range extending through Yukon into Alaska (4). The locality records for this species from Manitoba and British Columbia are numerous (13).

Anopheles walkeri Theobald

Fig. 2A

Description

In this species the inner clypeal hairs, Fig. 2A, are feathered.

Distribution

This is predominantly an eastern species. The only record from Western Canada is a single specimen collected at Esquimalt on Vancouver Island during the anopheline mosquito survey in 1944. Other records are from Aweme and Westbourne, Man. (13).

Anopheles freeborni Aitken

Description

The larva of this species appears to be indistinguishable from that of *A. punctipennis*.

Distribution

In Canada this species is restricted to the interior of British Columbia. Records include: Nicola Lake, Oliver, Revelstoke, Vernon (13).

Anopheles punctipennis (Say)

Fig. 2B

Description

The character in the key will separate this species from *A. occidentalis* and *A. walkeri*. The larva appears to be indistinguishable from that of *A. freeborni*.

Distribution

According to Matheson this is the most widespread species of *Anopheles* in North America, ranging through southern Canada south to the Mexican plateau. In Western Canada this species is largely restricted to southern Manitoba (5) and the Fraser valley of British Columbia (3). It has not been collected in Saskatchewan and is probably absent in Alberta. The 1944 anopheline survey (13) gave the following records: Brandon and Winnipeg, Man.; Agassiz, Davis Lake, Duncan, Chilliwack, Harrison Hot Springs, Hatzie, Hope, Ladner, McConnell Creek, Mission, Nanaimo, New Westminster, Royal Oak, Ruskin, Vancouver, Wellington, Yarrow, B.C.

Mansonia Blanchard

This genus is represented by a single species, *M. perturbans*. The larva is unique in that the siphon is modified for piercing plant tissues from which air is drawn for respiration. Owing to the fact that the larvae do not come to the surface, they are seldom encountered.

Mansonia perturbans (Walker)

Fig. 3

Description

Antenna very long and slender, much longer than the head; a large hair tuft at end of basal quarter, a pair of prominent hairs near the middle. Head hairs multiple. Lateral comb of eighth segment of a dozen scales arranged in an irregular single row, each scale long and slender. Anal segment long, ringed by the dorsal plate; lateral tuft multiple; ventral tuft well developed; upper and lower dorsal tufts multiple; gills shorter than anal segment. Siphon short, broad basally, and strongly attenuated distally, fitted for piercing plant tissues.

Distribution

This species is widely distributed over the North American continent. In Western Canada it has the following known distribution: Manitoba, collected by McLintock in the Winnipeg area and by Criddle at Aweme; Saskatchewan, collected by the writer at Waskesiu; British Columbia, reported by Hearle.

Wyeomyia Theobald

This genus is represented by a single species, *W. smithii*, the pitcher plant mosquito. Although records indicate that the species is rare, the writer feels that intensive search for it in places where the host plant occurs would augment the records.

Wyeomyia smithii (Coquillett)

Fig. 4 (Partly redrawn from Ross (10))

Description

Antenna one-third as long as head; tuft single, on distal third. Head hairs single; ante-antennal tuft single. Comb of eighth segment with seven scales in a single row. Anal segment not ringed by the dorsal plate; dorsal tuft a long double hair; tuft on posterior margin of plate three-haired; ventral brush replaced by two three-haired tufts, one on each side of the median line; gills broad, two in number. Siphon $3\frac{1}{2} \times 1$; pecten absent; tube beset with short single hairs.

Distribution

The range of this species is limited to the distribution of its host plant *Sarracenia purpurea*, the pitcher plant. It has been found at Aweme, Man. by Hearle and by Criddle. The writer has no other records.

Culiseta Felt.

This genus is represented by five species. One species, *C. inornata*, is characteristic of the open plains areas, while the other four species are almost completely restricted to the northern forested zone. The latter species are seldom encountered in large numbers, although the prairie species may on occasion become quite abundant, especially in late summer.

KEY TO SPECIES

1. Antenna longer than head, tuft on apical third; upper and lower head hairs very long, the lower (No. 6) double, Fig. 5A; pecten of scales only; anal segment elongated with five or six tufts of the ventral brush piercing the plate; Fig. 5B. *C. morsitans* (Theo.)
2. Antenna shorter than head, tuft near the middle; head hairs short, multiple, Fig. 6A; pecten of scales and long hairs; anal segment about as long as wide with none or only two or three tufts of ventral brush piercing the plate; Fig. 6B. 2
2. Upper and lower head hairs (Nos. 5 and 6 respectively) with similar number of branches; Fig. 7A. *C. impatiens* (Wlk.)
- Upper head hairs with 7–10 branches; lower head hairs with 3–5 branches. 3
3. None or only one tuft pierces the sclerotized plate of the ninth segment, Figs. 6 B and 8 B; antennae not prominently spined or pigmented, tuft near the middle. 4
- Three tufts pierce the sclerotized plate, Fig. 9 B; antennae prominently spined and pigmented, tuft before the middle; Fig. 9A. *C. alaskaensis* (Ludl.)
4. Basal pecten teeth simple or with one or two small appressed denticles; Fig. 8 B. *C. incidunt* (Thoms.)
- Basal pecten teeth flattened, with three or four appressed denticles; Fig. 6 B. *C. inornata* (Will.)

Culiseta morsitans (Theobald)

Fig. 5

Description

Antenna longer than head, spined, ending in three long, prominent hairs; tuft near apical third. Head hairs very long: upper (No. 5) in fours, lower (No. 6) double, postclypeal (No. 4) single. Lateral comb of eighth segment with scales in a large triangular patch, each scale narrow basally, gradually widening with a series of even teeth apically. Anal segment ringed by the dorsal plate; ventral brush with six tufts piercing the plate; lower tuft of dorsal brush branched. Siphon 5 × 1; pecten with 6–10 teeth on basal fourth; tuft at base of tube.

Distribution

This species appears to be rare in Western Canada. The writer has collected it only at Lac la Ronge. However, the Hearle collection has several specimens collected at Indian Head, Sask. It was recorded at Portage la Prairie, Man. during the 1944 anopheline survey. According to Dyar, the species is found in Alberta, British Columbia, and Yukon, the range extending north into Alaska.

Culiseta inornata (Williston)

Fig. 6

Description

Antenna shorter than head; sparsely spined; tuft small, near the middle. Head hairs: upper (No. 5) in eight, lower (No. 6) in four, postclypeal (No. 4)

a tuft of many hairs. Lateral comb of eighth segment with scales in a large triangular patch, each scale slipper-shaped, evenly fringed with spines. Anal segment ringed by the dorsal plate; ventral brush well developed with one or two tufts piercing the plate; lateral hair double or triple; gills as long as or slightly longer than, segment; dorsal brush, upper tuft fan-shaped, lower tuft a three-branched hair. Siphon $2\frac{3}{4} \times 1$; pecten basally of stout teeth, distally of long hairs; tuft near base of siphon.

Distribution

This is a very common species on the open plains areas of Western Canada. Owing to the fact that the species overwinters as the adult, small numbers of larvae may be found in early season. Generally the species does not appear in large numbers until late July or early August. There are several generations in a season. Larvae may be found in a variety of habitats: weedy roadside ditches temporarily filled with water; grassy pasture depressions; semi-permanent depressions in bluffs; permanent depressions in partly dried-up stream beds, etc. The species is usually found in association with *Culex tarsalis*. McLintock records the species as common and troublesome in the Winnipeg district. It has been found in large numbers in the Regina area. Brown (1) gives the following distribution for Alberta: Medicine Hat, Lethbridge, Edmonton, Beaverlodge, and Banff. According to Hearle, the species is comparatively rare in the Fraser valley.

Culiseta impatiens (Walker)

Fig. 7

Description

This species resembles *C. inornata* very closely. However, in *C. impatiens* the antennal tuft is before the middle; the upper (No. 5) and lower head hairs (No. 6) are similar; the gills are three to four times as long as the anal segment; three tufts pierce the sclerotized plate of the ninth segment.

Distribution

This is a northern woodland species. The writer has collected the species at Waskesiu. It has been reported from the Winnipeg area (5) and Churchill (15). In Alberta it has the following known distribution: Red Deer, Fawcett, Calgary (1). The writer has seen specimens from Banff collected by Hearle. The species is fairly common and widely distributed throughout the Fraser valley, specimens having been taken from Caulfields on the coast to Hope at the mouth of the Fraser canyon (3). According to Dyar the larvae are found in dark, permanent forest pools.

Culiseta incidunt (Thomson)

Fig. 8

Description

Antenna short, sparsely spined, with tuft just before the middle. Head hairs: upper (No. 5) of 10-12 branches, lower (No. 6) of five branches,

postclypeal hairs (No. 4) double or triple. Anal segment ringed by the dorsal plate, the latter deeply emarginate ventrally; ventral brush well developed with none or only one tuft piercing the plate. Siphon $2\frac{1}{2} \times 1$; pecten with basal teeth and distal hairs; pecten teeth simple or with only one extra denticle.

Distribution

This species is restricted to the Pacific Coast areas from Alaska to Southern California (8). It is the most common and most widespread mosquito in the Fraser valley (3). The writer has larvae from Kamloops, B.C., collected by Hearle, and from St. Elmo, B.C., collected by L. C. Curtis.

Culiseta alaskaensis (Ludlow)

Fig. 9

Description

Antenna distinctly spined, pigmented; tuft before the middle. Head hairs: upper of six branches, lower of three, postclypeals double. Eighth segment of many dark scales in a triangular patch. Anal segment ringed by dorsal plate; three tufts pierce the plate ventrally; immediate area around each puncture heavily pigmented. Siphon 2×1 ; pecten with basal teeth and distal hairs; teeth with one extra denticle.

Distribution

This species has a wide distribution in the northern forested areas of Western Canada, although it does not appear to be common in any area. It has been recorded from Churchill, Man. (15), from Waskesiu, Sask. (9), from Alberta (12), from Vancouver and Vancouver Island (13).

Culex Linnaeus

The genus *Culex* has few representative species in northern areas. It is most common and most widespread in the tropical and subtropical regions of the Americas. Four species have been reported from Western Canada. Of these, only *C. tarsalis* is at all common and widespread. It is frequently numerous in dry, open plains areas. *C. pipiens* has been introduced into the Vancouver area; *C. restuans* has its northernmost limit of distribution extending into Manitoba; *C. apicalis* has been encountered as far north as Lac la Ronge in Saskatchewan.

KEY TO SPECIES

1. Lower head hairs (No. 6) long and single; upper head hairs (No. 5) double; air tube very long and narrow; four pairs of long-haired ventral tufts on siphon; Fig. 11B. *C. apicalis* Adams
Head hairs multiple. 2

2. Tufts on air tube multiple. 3
Some tufts on air tube long single hairs; Fig. 13B. *C. restuans* Theob.

3. Six pairs of ventral multiple tufts on air tube; Fig. 12B. *C. tarsalis* Coq.
Three pairs of ventral and one pair of lateral tufts on air tube; Fig. 10 B. *C. pipiens* Linn.

Culex pipiens Linnaeus

Fig. 10

Description

Antenna slender, as long as head, abruptly narrowed beyond tuft; tuft on apical third. Head hairs: upper (No. 5) and lower (No. 6) multiple, postclypeal hairs (No. 4) single. Comb of eighth segment of many scales in a triangular patch. Anal segment ringed; ventral brush well developed; gills slightly longer than anal segment; dorsal brush, upper tuft a three-branched hair, lower tuft a single hair. Siphon 5×1 ; pecten of approximately a dozen teeth on basal fifth; four tufts beyond the pecten, one out of line.

Distribution

This house mosquito has an eastern distribution extending from Nova Scotia west to Manitoba (14). It is also reported from Vancouver by Hearle and from Edmonton by Brown.

Culex apicalis Adams

Fig. 11

Description

Antenna long and slender, abruptly constricted beyond the tuft; spined; tuft well developed, on outer third of antenna. Head hairs: upper (No. 5) single or double, lower (No. 6) single, postclypeal (No. 4) small and single. Comb on eighth segment a large triangular patch of scales. Anal segment long, ringed by the plate; gills as long as, or longer than, segment; dorsal brush, upper tuft triple, lower tuft a single long hair. Siphon narrow and very long, 7×1 ; pecten on basal third of siphon; four pairs of prominent tufts beyond the pecten and one or two small tufts near the end of siphon.

Distribution

This species prefers to breed in places where the water is cool and shaded by long grass. It is generally very localized and the adult does not feed on warm-blooded animals. This would account for the fact that the species generally escapes notice. It has been reported from the Winnipeg area. The writer has collected larvae at Lac la Ronge but has not encountered the species anywhere else in Saskatchewan. Brown reports the species from Edmonton. According to Hearle the species is generally distributed and fairly common between Pitt Meadows and Agassiz in the Fraser valley of British Columbia.

Culex tarsalis Coquillett

Fig. 12

Description

Antenna long and slender, tuft large, near apical third. Head hairs: upper and lower (Nos. 5 and 6) multiple, postclypeals small, single. Comb of eighth

segment in a large triangular patch. Anal segment ringed by the dorsal plate; ventral brush well developed; dorsal brush with upper tuft of three branches, lower tuft a single hair. Siphon $5\frac{1}{2} \times 1$; pecten on basal third; five to six pairs of tufts beyond the pecten.

Distribution

This species is widely distributed over the open plains areas of Western Canada, the distribution extending into the neighboring park belt area. It breeds abundantly in weedy roadside ditches. It overwinters as the adult female and there may be several generations a season. It appears that in Western Canada few adults manage to survive the rigors of a cold climate. Hence the spring population begins with small numbers. However, if climatic conditions are favorable during the summer, their numbers may be large by early August. The northern limit of the species appears to be a line running in a northwesterly direction from Winnipeg through Yorkton and Saskatoon, then west toward Banff. Hearle found it generally distributed in the Fraser delta.

Culex restuans Theobald

Fig. 13

Description

Antenna long and slender with tuft before the middle. Head hairs multiple. Lateral comb of eighth segment in a large triangular plate. Anal segment longer than wide, ringed by the dorsal plate; ventral brush well developed; dorsal brush consisting of two single hairs on each side. Siphon long and slender, pecten restricted to the basal one-third; three tufts in the form of single hairs and one small multiple tuft near the apex.

Distribution

In Western Canada this species is largely restricted to southern Manitoba with a distribution extending into the southeastern corner of Saskatchewan.

Aedes Meigen

The hordes of mosquitoes of the Canadian Northwest are *Aedes* mosquitoes. The vivid tales of trappers, explorers, and prospectors of the Canadian arctic refer to the members of this group. In the great majority, if not in all, the egg must undergo a period of desiccation. Oviposition occurs in grassy low-lying areas which are dry during most of the short summer but which are flooded in the spring following the melting of snow. The larvae begin to appear early, at times when the temperature of the water is little above freezing and when ice and snow are still present in protected spots. The great majority of species make their appearance in quick succession. As a consequence, during May and early June, mosquito larvae are found in countless numbers in every suitable habitat, while hardly a larva is to be found in the same spots in July or August. Although only one generation is produced, adults are on the wing during all of the short summer season.

The adult taxonomy of the northern species is beset with difficulties since many belong to the so-called black-legged group. Owing to the fact that larvae are absent during most of the summer season and the population is almost exclusively made up of rubbed females, identification of species is next to impossible. Hence anyone intending to study these northern forms should make every effort to reach a desired locality in early season to enable him to collect larvae. Not only do the larvae possess useful taxonomic characteristics, but the immature stages permit rearing of males and unrubbed females.

KEY TO SPECIES

1. Anal segment ringed by dorsal plate.....	2
Anal segment not ringed by dorsal plate.....	5
2. Scales of lateral comb of eighth segment arranged in a triangular patch; tuft on air tube below base of last pecten tooth; Fig. 15.....	<i>A. nigripes</i> Zett.
Scales of lateral comb of eighth segment not arranged in a triangular patch; tuft on air tube beyond base of last pecten tooth.....	3
3. Scales of lateral comb in a single row; Fig. 42 B.....	<i>A. cyclocerculus</i> Dyar
Scales of lateral comb in a double row.....	4
4. Pecten extends over basal two-thirds of siphon, last two teeth widely detached; tuft minute; Fig. 17.....	<i>A. nigromaculatus</i> (Ludl.)
Pecten ends before middle of siphon, all teeth evenly spaced; tuft large; Fig. 22.....	<i>A. punctor</i> (Kby.)
5. Antenna as long as, or longer than, the head.....	6
Antenna shorter than the head.....	7
6. Antenna as long as head, strongly arched, widened at the base and strongly constricted at point of origin of the tuft; tuft beyond the middle; head hairs double; Fig. 41.....	<i>A. aurifer</i> Coq.
Antenna considerably longer than head, not strongly arched, slender, gradually tapering from base to apex, tuft near the middle; head hairs usually triple; Fig. 25.....	<i>A. dianaeus</i> H. D. & K.
7. Pecten extends to near apex of air tube, far beyond ventral hair tuft.....	8
Pecten extends at most over two-thirds of air tube, tuft is situated beyond pecten.....	9
8. Air tube with four dorsal and two lateral tufts in addition to a ventral tuft; Fig. 20.....	<i>A. trichurus</i> (Dyar)
Air tube with ventral tuft only; Fig. 21.....	<i>A. cataphylla</i> Dyar
9. Head rounded, as long as wide; upper head hairs long and single, lower head hairs short, double, or triple, a pair of small multiple tufts between lower head hairs; short multiple hair tufts on abdominal segments; Fig. 43 (a tree-hole breeding mosquito).....	<i>A. triseriatus</i> (Say)
Head wider than long; lower head hairs never with more branches than upper head hairs.....	10
10. Upper and lower head hairs single.....	11
Upper head hairs double, triple, or multiple.....	17
11. Gills extremely short, budlike; Fig. 23.....	<i>A. dorsalis</i> (Meig.)
Gills not budlike, usually longer than anal segment.....	12
12. Ventral brush consists of two three-haired tufts; gills very long, broad, bluntly rounded apically; Fig. 26.....	<i>A. varipalpus</i> (Coq.)
Ventral brush well developed consisting of numerous tufts.....	13
13. Scales of lateral comb of eighth segment arranged in a single or irregular double row.....	14
Scales of lateral comb of eighth segment arranged in a triangular patch.....	16
14. Gills very long, four or five times as long as anal segment; Fig. 28.....	<i>A. nearcticus</i> Dyar
Gills as long as, or only slightly longer than, anal segment.....	15
15. Comb of eighth segment an irregular row of about 14 scales (mountain meadows of British Columbia).....	<i>A. idahoensis</i>
Comb of eighth segment an irregular row of about 8 to 11 scales; Fig. 19 (a prairie species).....	<i>A. spencerii</i> (Theo.)

16. Scale of lateral comb of eighth segment flattened and evenly fringed apically; gills almost twice as long as anal segment; one tuft of ventral brush precedes barred area; Fig. 30	<i>A. communis</i> De G.
Scale of lateral comb of eighth segment pointed, the median spine being longer than the lateral ones; gills barely longer than anal segment; three or four tufts of ventral brush preceding barred area; Fig. 14	<i>A. impiger</i> (Wlk.)
17. Lower head hairs usually single, upper double or triple	18
Lower head hairs not single	21
18. Pecten extends beyond the middle of air tube, last tooth slightly detached; gills short, budlike; Fig. 24	<i>A. campestris</i> D. & K.
Pecten does not extend to middle of air tube, all teeth evenly spaced; gills not budlike, as long as or longer than, anal segment	19
19. Prothoracic hairs 1 and 5 single; lateral abdominal hairs on sixth abdominal segment single; Fig. 16	<i>A. stimulans</i> (Wlk.)
Prothoracic hairs 1 and 5 two or three-branched; lateral abdominal hairs on sixth abdominal segment double	20
20. Air tube more than three times as long as wide; prothoracic hairs 1 and 5 double; Fig. 33	<i>A. incrépitus</i> Dyar
Air tube short, about twice as long as wide; prothoracic hairs 1 and 5 triple; Fig. 40	<i>A. lateralis</i> (Meig.)
21. Upper and lower head hairs double	22
Upper and lower head hairs not both double, at least one being triple or multiple	23
22. Scales of comb of eighth segment in irregular double row; pecten extends over two-thirds of air tube with the last three teeth very widely separated; Fig. 35	<i>A. riparius</i> D. & K.
Scales of comb of eighth segment in a triangular patch; pecten extends to middle of air tube; Fig. 32	<i>A. excrucians</i> (Wlk.)
23. Upper head hairs triple or multiple, lower double	24
Upper and lower head hairs triple or multiple	25
24. Last two teeth of pecten widely separated; Fig. 18	<i>A. vexans</i> (Meig.)
All teeth of pecten evenly spaced; Fig. 27	<i>A. sticticus</i> (Meig.)
25. Scales on eighth segment in single or irregular double row	26
Scales on eighth segment in a triangular patch	27
26. Head hairs flattened; scales on eighth segment largely in a single row; tuft on air tube very small, considerably beyond pecten; Fig. 38	<i>A. cinereus</i> Meig.
Head hairs normal; scales on eighth segment arranged in a double row; tuft of air tube large, near base of last pecten tooth; Fig. 36	<i>A. intrudens</i> Dyar
27. Air tube more than four times as long as wide; scales on eighth segment with prominent median spine	28
Air tube approximately three times as long as wide; scales on eighth segment evenly spined	29
28. Prothoracic hair 1 long and triple; long subdorsal hairs on abdominal segments 3 - 7; scale on eighth segment with long median spine margined by many fine spinules; Fig. 31	<i>A. fitchii</i> (F. & Y.)
Prothoracic hair 1 single; abdominal segments without long subdorsal hairs; scale on eighth segment with prominent spines, the median one projecting markedly beyond the lateral; Fig. 34	<i>A. flavescens</i> (Müll.)
29. Prothoracic hairs 1 and 5 both single; Fig. 27	<i>A. canadensis</i> (Theo.)
Prothoracic hair 5 triple	30
30. Prothoracic hair 1 single, hair 5 triple; upper and lower head hairs with 4 branches; Fig. 29	<i>A. pionips</i> Dyar
Prothoracic hair 1 double, hair 5 triple; upper head hairs with 6 - 8 branches; Fig. 39	<i>A. pullatus</i> (Coq.)

Aedes impiger (Walker)

Fig. 14

Description

Antenna short, spined; tuft before the middle. Head hairs single. Prothoracic hair formula 2 1 2 - 1 - 2 1 3. Lateral abdominal hairs double on segments one to four, single on remainder. Eighth segment with scales in a

triangular patch. Dorsal plate heavily covered with minute spines, extending two-thirds down the side; ventral brush with four tufts preceding the barred area; gills short. Siphon $2\frac{1}{2} \times 1$; pecten of evenly spaced teeth extending just beyond the basal one-third of the tube; tuft of long hairs before the middle of the tube.

Distribution

In Saskatchewan this species is restricted to the park belt area, breeding in small grassy pools in poplar bluffs. It has not been encountered in large numbers. McLintock did not find it in Manitoba. Alberta records include Red Deer, Edmonton, Banff, and Nordegg. The Hearle collection contains specimens collected at Kamloops by G. M. Neal.

Aedes nigripes (Zetterstedt)

Fig. 15

Description

Antenna small, spined; tuft near the middle. Head hairs single. Prothoracic hair formula $3\ 1\ 1 - 1 - 4\ 1\ 4$. Lateral abdominal hairs multiple on segments one and two, double on remainder. Eighth segment with scales in a triangular patch of about 15 scales, each scale with a long median point. Anal segment ringed by the dorsal plate; ventral brush with one tuft preceding the barred area; gills longer than anal segment. Siphon $2\frac{3}{4} \times 1$; pecten with two or three teeth detached, reaching just beyond the middle of tube; tuft below the last pecten tooth.

Distribution

This is a species of the arctic region. It has been reported from Churchill and the Northwest Territories. Records outside Canada include Greenland, Alaska, Siberia, and northern Europe. According to Twinn (15) it is the most abundant mosquito in the Churchill region beyond the forest.

Aedes stimulans (Walker)

Fig. 16

Description

Antenna slender, spined; tuft near the middle. Head hairs, upper double, lower single. Prothoracic hair formula $1\ 1\ 2 - 1 - 1\ 1\ 2$. Lateral abdominal hairs triple on first, double on second to fifth, single on sixth. Eighth segment with scales in a triangular patch, each scale with a series of spines, the median larger than the lateral ones. Dorsal plate extends far down the side; ventral brush with four tufts preceding the barred area. Siphon 3×1 ; pecten of evenly spaced teeth extending over basal third of tube; large tuft beyond pecten.

Distribution

Larvae of this species have not been found in Saskatchewan. However, adults collected at Waskesiu were identified by Dr. Matheson as *A. stimulans*.

Brown reports it from Medicine Hat and Edmonton. According to Dyar the species is found in Yukon.

Aedes nigromaculis (Ludlow)

Fig. 17

Description

Antenna smooth; tuft a single or double hair before the middle. Head hairs, upper and lower single. Prothoracic hair formula 1 1 1 - 1 - 1 1 3. Lateral abdominal hairs 2 (3) 2 2 2 1 1. Scales on eighth segment in a patch of 8 - 12 scales; single scale with long apical spine and a few minute basal spinules. Anal segment ringed by the dorsal plate; ventral brush posterior to plate; gills longer than anal segment. Siphon $2\frac{1}{2} \times 1$, conical; pecten reaches to outer one-fourth, the last two teeth widely separated; tuft very small, just beyond the pecten.

Distribution

In Western Canada this species is largely restricted to the open plains areas. It is rare in southern Manitoba, but common in Saskatchewan from Regina south. It has been reported from Medicine Hat, Lethbridge, and Beaverlodge in Alberta. In southern Saskatchewan it breeds extensively in shallow pasture depressions during July.

Aedes vexans (Meigen)

Fig. 18

Description

Antenna slender, spined; tuft small, before the middle. Head hairs, upper 3 or 4, lower 2 or 3. Prothoracic hair formula: 1 1 2 - 1 - 1 1 3. Lateral abdominal hairs 4 4 3 3 2 1. Scales on the eighth segment in an irregular double row, each scale with a long apical spine and minute basal spinules. Dorsal plate well developed, reaching to near mid-ventral line; ventral brush with four tufts before the barred area. Siphon 3×1 ; pecten reaches to middle with the last two teeth detached; tuft very small, beyond the pecten.

Distribution

This is the most widely distributed species. It is found on the open prairie and in the parkbelt zone and extends into the northern forested zone (Waskesiu). The species readily invades populated centers and in consequence it frequently is a serious pest in cities. It is the second worst prairie species in Saskatchewan, being surpassed only by *Aedes spencerii*. McLintock considers it the worst species in the Winnipeg area. It is the most annoying species in the Regina district in midsummer. The Alberta distribution includes Medicine Hat, Lethbridge, Calgary, Red Deer, Edmonton, and Banff. According to Hearle the species is distributed throughout the Lower Fraser valley where, periodically, it may occur in enormous numbers.

The writer has also found it in great outbreaks in the park belt areas of central Saskatchewan. According to Dyar the species is absent from the forested zone. However the writer has collected specimens at Waskesiu, Sask., which is in the northern forested region. Mail (6) states that in Montana the species is found in the mountains as well as on the prairies.

It is one of the most widely distributed species in the Nearctic region (8) and occurs practically throughout the Palearctic and Oriental regions (7).

Although the larvae may be found in a variety of habitats, especially those rich in organic matter, the species prefers open meadow and pasture depressions.

Aedes spencerii (Theobald)

Fig. 19

Description

Antenna spined; tuft small, before the middle. Head hairs single. Prothoracic hair formula 1 1 2 - 1 - 1 1 3. Lateral abdominal hairs 3 2 2 1 1 1. Scales on the eighth segment in an irregular double row, each scale with a prominent apical spine and minute basal spinules. Dorsal plate extends to near mid-ventral line; ventral brush with one or two small tufts preceding the barred area. Siphon 2 X 1; pecten reaches to middle of tube with two teeth detached; tuft small, beyond pecten.

Distribution

This is the most common and widespread species on the Canadian prairies, occurring in Manitoba, Saskatchewan, and Alberta. The larvae appear generally during the first week in May, being found in pasture depressions and weedy roadside ditches. The adults are diurnal, attacking fiercely in the hot afternoon. This is the most annoying pest of man and animal over the larger part of the agricultural area of Saskatchewan. The adults are generally on the wing from mid-May to mid-June. If weather conditions are favorable, there may be a second or even a third brood.

Aedes trichurus (Dyar)

Fig. 20

Description

Antenna short with numerous minute black spines; tuft before the middle. Head hairs: upper double, lower single. Prothoracic hair formula 1 1 2 - 1 - 3 1 6. Lateral abdominal hairs triple on the first, double on the second and third, single on others. Scales on eighth segment in two rows; each scale with a prominent large median spine and small basal spinules. Anal segment almost ringed by dorsal plate. Siphon 2 $\frac{3}{4}$ X 1, gradually tapering; pecten extends over almost entire length of tube, with five teeth widely detached; large tuft within pecten; additional tufts on dorsal and lateral surface of siphon.

Distribution

This is a woodland species. The writer has a long series from Waskesiu and has also collected it at Lac la Ronge. Manitoba records include Aweme, Clear Lake, and Winnipeg. The writer has seen specimens from Banff collected by Hearle. Other records from Alberta include Edmonton, Fawcett, and Beaverlodge. It has been taken at Kaslo, B.C.

Aedes cataphylla Dyar

Fig. 21

Description

Antenna with minute dark spines; tuft near the middle. Head hairs single. Prothoracic hair formula $1\ 1\ 1 - 1 - 2\ 1\ 3$. Lateral abdominal hairs double on the first four segments, single on the remainder. Scales on eighth segment in a double row, each scale with a long median spine. Anal segment not ringed. Siphon $2\frac{3}{4} \times 1$; pecten reaches to near end of tube, with several teeth, especially the last one, widely detached; tuft of three hairs near the middle.

Distribution

This is a woodland species. The writer has a long series from Waskesiu. He has seen specimens from Banff (coll. Hearle) and from Kamloops (coll. Neal). It has not been reported from Manitoba. According to Dyar it is the dominant species in the Lake Louise and Cranbrook regions of Alberta.

Aedes punctor (Kirby)

Fig. 22

Description

Antenna spined; tuft considerably before the middle. Head hairs stout, usually single. Prothoracic hairs stout; hair formula $2\ 1\ 1 - 1 - 1\ 1\ 3$. Lateral abdominal hairs double on first segment, single on remainder. Eighth segment with scales in a double row, each scale with long median spine. Anal segment ringed by dorsal plate; ventral brush well developed, with tufts preceding the barred area but not puncturing the plate. Siphon $2\frac{1}{2} \times 1$; pecten with evenly spaced teeth, reaching to near middle of tube, followed by a tuft of long hairs.

Distribution

This is a northern woodland species. The writer has collected it at Waskesiu and at Lac la Ronge. He has seen specimens from Banff collected by Hearle. The species has been reported from Churchill and from the Fraser valley. That this is a northern species would appear from the fact that it forms a major part of the mosquito fauna of Alaska.

Aedes dorsalis (Meigen)

Fig. 23

Description

Antenna sparsely spined, slender; tuft before the middle. Head hairs single. Prothoracic hair formula 2 1 2 - 1 - 2 1 4. Lateral abdominal hairs 3 3 2 2 2 2. Scales on the eighth segment in a triangular patch of about 30 scales, each scale with prominent even spinules. Dorsal plate extends two-thirds down the side; ventral brush with several tufts before the barred area; gills short, budlike. Siphon 3 X 1; pecten with evenly spaced teeth extending to middle of tube; tuft three-fifths from base of siphon. This is a highly variable species and the taxonomic characters listed above must be used with much caution.

Distribution

This is a species of the plains with a distribution extending from Manitoba west to the Rockies. It prefers alkaline pools in open pasture areas. The writer has also found it in the wooded Carlyle district. Much has been made of the fact that in this species the gills are budlike, but the writer has found that the length of the gills in mosquitoes and in midges (Tendipedidae) can be correlated with the degree of salinity of the water. The more alkaline the water, the shorter the gills. This is a most annoying prairie species. In Saskatchewan it generally does not become common until July, but in Manitoba it has been found to appear in early spring. Under favorable environmental conditions the species may have several broods a season. In Alberta the distribution extends as far north as Edmonton. In British Columbia Hearle found the species along the coast from White Rock to Caulfields breeding in coastal rock pools of high salinity. He also reports it from Duncan, Vancouver Island, where it was found to breed extensively in a large salt marsh.

Aedes campestris (Dyar and Knab)

Fig. 24

Description

Antenna prominently spined; tuft at middle. Head hairs: upper double or triple, lower single. Prothoracic hair formula 2 1 2 - 1 - 3 1 3. Lateral abdominal hairs double on segments one to seven. Scales on the eighth segment in a triangular patch of about 26 scales, each scale with prominent spines, the median a little larger than the lateral. Dorsal plate extends two-thirds down the side; ventral brush with four tufts preceding the barred area; gills short, budlike; siphon 2½ X 1; pecten extending beyond the middle of the tube, the last tooth slightly more widely spaced than others; tuft large, about two-thirds from base of siphon.

Distribution

This is predominantly an open plains mosquito preferring pools rich in organic matter and a pH that is on the alkaline side. It is a serious pest in

the Regina area, breeding in tremendous numbers in grassy low-lying places adjoining the city "dump" area. In Saskatchewan the species is on the wing at the end of June. There appears to be only one brood. It is the main species on the extensive low-lying alkaline grass lands around the Quill Lakes. Owing to its marked preference for alkaline habitats, the species has a limited distribution in Saskatchewan. It has been reported from the Winnipeg area and from Churchill. In Alberta the distribution includes Medicine Hat, Lethbridge, and Edmonton. The writer has seen specimens from Kamloops. According to Dyar the species occurs in the Yukon area.

Aedes diantaeus Howard, Dyar, and Knab

Fig. 25

Description

Antenna very long, longer than head, spined; tuft at middle. Head hairs: upper in three, lower double. Prothoracic hair formula 1 1 1 - 1 - 1 1 2. Lateral abdominal hairs triple on segments one and two, double on three, four, and five, single on six. Comb on eighth segment in a patch of 10-20 scales, each scale with median long spine and a few small basal spinules. Anal segment nearly ringed by dorsal plate; ventral brush with four tufts preceding the barred area. Siphon 3 X 1; pecten covers the basal two-fifths of tube, two teeth detached; tuft of long hairs beyond the pecten.

Distribution

According to Dyar this species is rare and local, found in the Canadian forested region. It has been reported from Alaska. The writer has not collected the species in northern Saskatchewan, nor is it reported from Churchill, Man., or Banff, Alta.

Aedes varipalpus (Coquillett)

Fig. 26 (Redrawn from Dyar (2))

Description

The writer has no larvae of this species. The description that follows is taken from Dyar. Antenna moderate, slender, a hair at the middle. Head hairs single, anteantennal tuft in four. Lateral comb of the eighth segment a small patch of scales irregularly two rows deep. Air tube less than three times as long as wide, conical outwardly; pecten reaching the basal third, distantly followed by a three-haired tuft. Anal segment about as long as wide, the plate reaching the middle of the side; ventral brush consisting only of two three-haired tufts; dorsal tuft in five on each side; lateral hair single, rather long. Anal gills enormous, four times as long as the segment, broad, saclike, tracheated, and dotted.

Distribution

This is a tree-hole breeding species, restricted in Canada to British Columbia. Hearle found it very generally distributed in the Lower Fraser valley.

Aedes sticticus (Meigen)

Fig. 27

Description

Antenna short, spined, with tuft just before middle. Head hairs: upper in four, lower double. Prothoracic hair formula 1 1 1 - 1 - 1 1 3. Lateral abdominal hairs double on segments one to five, single on six. Comb on eighth segment in a triangular patch of about 25 scales, each scale with a median spine and minute lateral spinules. Anal segment short, with dorsal plate extending far down the sides; ventral brush well developed with one or two tufts preceding the barred area. Siphon $2\frac{1}{2} \times 1$; pecten extends to near middle of tube, all teeth evenly spaced; tuft of long hairs beyond the pecten.

Distribution

This species has been frequently referred to in the literature as *Aedes hirsuteron* (Theobald). McLintock records the species from the Winnipeg area. The writer has collected it in a wooded area near Trossachs in southern Saskatchewan.

Aedes nearcticus Dyar

Fig. 28

Description

Antenna short, smooth, with a small tuft near the middle. Head hairs: upper and lower, single. Prothoracic hair formula 1 1 1 - 1 - 3 1 3. Lateral abdominal hairs triple on segment one, double on two to five, single on six. Scales on eighth segment in irregular double row, 8 - 12, each scale with a long median spine and small basal lateral spinules. Anal segment not ringed by the dorsal plate; anal gills very long. Siphon $2\frac{1}{2} \times 1$; pecten of closely set teeth, none detached; extending over basal one-third of tube; tuft near middle.

Distribution

This is a northern species with a range extending from the lower margin of the forested zone into the arctic. It has been recorded from Churchill, Waskesiu, and Banff. Outside Canada the species extends south along the Rocky Mountains to Montana and north into Alaska.

Aedes pionips Dyar

Fig. 29

Description

Antenna slender, curved, two-thirds as long as head, spined; tuft of many long hairs, located before the middle. Head hairs: upper and lower, multiple. Prothoracic hair formula 1 1 1 - 1 - 3 1 3. Lateral abdominal hairs double on segments one to five, single on six. Eighth segment with a large number of scales (60 - 70) in a triangular patch, each scale slipper-shaped, evenly spined apically. Anal segment not ringed by the dorsal plate; ventral brush well

developed, with two small tufts preceding the barred area. Siphon $2\frac{1}{2} \times 1$, uniformly tapering; pecten of closely-set teeth not quite reaching the middle of the tube; tuft large, at middle.

Distribution

This species inhabits the northern forested zone. The writer has collected numerous specimens at Prince Albert, at Waskesiu, and at Lac la Ronge. Larvae have been collected from May 15 to July 15. The species has been reported from Churchill and from Banff. Its distribution extends north from Alberta and British Columbia through the Yukon and the Northwest Territories into Alaska.

Aedes communis (De Geer)

Fig. 30

Description

Antenna sparsely spined, curved, half as long as head; tuft before the middle. Head hairs: upper and lower, single. Prothoracic hair formula 2 1 1 - 1 - 3 1 3. Lateral abdominal hairs double on first five segments, single on sixth. Scales on eighth segment in a triangular patch, 50 - 60 in number, each scale broadened apically and evenly fringed with spines. Anal segment not ringed by dorsal plate; ventral brush well developed, with two tufts before the barred area; gills fairly long. Siphon $2\frac{1}{4} \times 1$: uniformly tapering; pecten of closely set teeth not reaching the middle; tuft large, near middle of tube.

Distribution

This is a common species in the coniferous forest zone of Western Canada. It is the most common species in northern Saskatchewan. It has been reported from Churchill and Banff. Its range extends south into the United States and north through Alaska into Siberia and northern Europe.

Aedes fitchii (Felt and Young)

Fig. 31

Description

Antenna spined; tuft inserted just before the middle. Head hairs long and prominent: upper in three or four, lower in three. Prothoracic hairs long, formula 3 1 1 - 1 - 2 1 4. Lateral abdominal hairs double on segments 1 to 6; long subventral hairs on segments 3, 4, and 5; long subdorsal hairs on segments 3 to 7. Eighth segment with scales in a triangular patch, single scale with prominent median spine margined with fine spinules. Anal segment not ringed by dorsal plate; ventral brush with several tufts preceding the barred area; gills long. Siphon $4\frac{1}{2} \times 1$; pecten of evenly set teeth reaching to near middle of tube; tuft of a few long hairs situated at the middle of the tube.

Distribution

This species is rare on the open prairie. Where encountered the larvae are found in pools near bluffs. In Saskatchewan the species is, however, quite

common in the park belt area and in the northern forested zone (Waskesiu). It is rare in southern Manitoba. It has been recorded from Banff and Edmonton in Alberta and the writer has seen specimens from Kamloops, collected by G. M. Neal. Northward its distribution extends through Yukon and Northwest Territories into Alaska.

Aedes excrucians (Walker)

Fig. 32

Description

Antenna with coarse spines; tuft before the middle. Head hairs long and prominent, double. Prothoracic hairs long, formula 1 1 1 - 1 - 1 3. Lateral abdominal hairs double on first and second, single on other segments; long subventral and subdorsal hairs on segments 3, 4, and 5. Eighth segment with scales in a triangular patch of about 20 scales, each scale with a prominent median spine. Dorsal plate extends far down the side; ventral brush with 5 - 6 tufts preceding the barred area. Siphon 4 X 1; pecten reaches to near middle with the last two teeth detached; tuft consists of four or five long hairs about three-fifths from the base of the tube.

Distribution

This species has a distribution similar to that of *Aedes fitchii*, but is not nearly so common. Only rarely are specimens encountered on the open prairie, but the species can be quite common in the northern forested areas (Waskesiu). It is reported to be rare in the Winnipeg area. Further Manitoba records include Churchill. It has been found at Red Deer, Banff, and Edmonton in Alberta and at Kamloops, B.C. Its northward distribution extends through Yukon and Northwest Territories into Alaska.

Aedes increpitus Dyar

Fig. 33

Description

Antenna slender, spined; tuft before the middle. Head hairs: upper double or triple, lower single or double. Prothoracic hair formula 2 1 1 - 1 - 2 1 3. Lateral abdominal hairs double. Eighth segment with scales in a triangular patch, single scale evenly rounded with many spines. Anal segment long, not ringed by dorsal plate; gills short. Siphon 3 X 1; pecten of evenly spaced teeth, reaches just beyond basal one-third of tube; tuft of three long hairs near the middle.

Distribution

This species is rare in Western Canada. Hearle records it as *A. mutatus* in British Columbia, probably breeding in rock pools filled by the rise of the Fraser River at freshet. In Saskatchewan the species has been encountered only in a small stagnant creek flowing through bluff country near Regina.

Aedes flavescens (Müller)

Fig. 34

Description

Antenna heavily spined; tuft near the middle. Head hairs: upper in four, lower in three. Prothoracic hair formula 1 1 3 - 1 - 2 1 3. Lateral abdominal hairs 3 2 2 2 2 2. Scales on eighth segment in triangular patch, each scale with prominent median spine and small basal spinules. Dorsal plate reaches well down the sides; ventral brush with four or five tufts before the barred area; gills slightly longer than anal segment. Siphon $3\frac{1}{2} \times 1$; pecten reaches to middle of tube with last tooth somewhat detached; tuft just beyond pecten.

Distribution

This is mainly a species of the open prairie, where it breeds in heavily overgrown and partly shaded semipermanent pools. It is a serious livestock pest in many parts of the agricultural areas in southern Saskatchewan. The species extends its range through the park belt zone (Melfort) into the forested areas (Waskesiu). It has been reported from Manitoba, being found as far north as Churchill. The Alberta distribution includes Medicine Hat, Lethbridge, Calgary, Drumheller, Red Deer, Edmonton. According to Hearle it is rare in British Columbia. Since it has been reported from Alaska, its northward distribution probably extends through Yukon and Alaska.

Aedes riparius Dyar and Knab

Fig. 35

Description

Antenna moderately spined, narrowed beyond tuft; hair tuft of a few long hairs, located before middle of antenna. Head hairs double, long and prominent. Prothoracic hair formula 1 1 3 - 1 - 1 1 3. Lateral abdominal hairs double on segments one to seven. Scales on eighth segment in an irregular double row, single scale with prominent median spine and small but distinct basal spines. Dorsal plate reaches two-thirds down the side; ventral brush with four to five tufts preceding the barred area; gills long. Siphon $3\frac{1}{2} \times 1$; pecten reaches beyond middle of tube, the last two or three teeth widely detached; tuft of two or three hairs, about one-third from end of siphon.

Distribution

This species is found in the park belt and forested areas of Saskatchewan. The writer has collected larvae at Saskatoon, at Waskesiu, and at Lac la Ronge. The species is rare in its southern range, but quite common at Lac la Ronge. It has been reported from Manitoba.

Aedes intrudens Dyar

Fig. 36

Description

Antenna moderately spined; tuft of about seven hairs, before the middle. Head hairs triple. Prothoracic hair formula 1 1 2 - 1 - 1 1 3. Lateral abdominal

hairs double on first segment, single on remainder. Scales on eighth segment in irregular double row, each scale with a long median spine. Dorsal plate extends far down the side; ventral brush with two small tufts before the barred area; gills longer than segment. Siphon $2\frac{1}{2} \times 1$; pecten with the last two or three teeth detached, reaching just beyond middle of tube; tuft of three or four long hairs on level of the last pecten tooth.

Distribution

This species is widely distributed over Western Canada. It is rare on the open prairie, but common in the northern wooded areas. The writer has encountered numerous specimens in his collections from Waskesiu and from Lac la Ronge. It has been recorded from Winnipeg and Churchill. The writer has also seen specimens in the Hearle collection at Kamloops, collected at Banff, Alta. It is probably present in Yukon and Northwest Territories since it has been reported from Alaska.

Aedes canadensis (Theobald)

Fig. 37

Description

Antenna slender, slightly curved, spined all over. Head hairs multiple. Prothoracic hairs 1 1 2 - 1 - 1 1 3. Lateral abdominal hairs double on first five segments, single on sixth. Eighth segment with scales in a triangular patch, each scale with a series of minute apical spines, the median slightly larger than the lateral ones. Siphon 3×1 ; pecten extending over basal one-third, all teeth evenly spaced; large tuft beyond the pecten.

Distribution

This is principally a woodland species. In Saskatchewan it has been found in large numbers in northern parts of the park belt area (Melfort). The writer has also collected it at Prince Albert and at Waskesiu. It has been reported from Manitoba and British Columbia. The writer has seen specimens collected at Banff by Hearle.

Aedes cinereus Meigen

Fig. 38

Description

Antenna narrow, prominently spined; tuft of several hairs, near the middle. Head hairs flattened; upper in fours, lower in threes. Prothoracic hairs flattened, formula 1 1 1 - 1 - 1 1 3. Lateral abdominal hairs double on first and second segments, single on remainder. Scales on eighth segment in an irregular double row, each scale with a long median spine margined by minute spinules; hairs on eighth segment tend to be flattened. Anal segment not ringed; ventral brush moderately well developed. Siphon 3×1 , gradually narrowing distally; pecten extends for two-thirds of length of tube, last three or four teeth detached; tuft minute, beyond pecten.

Distribution

This species is found generally along the northern fringe of the prairie, extending through the park belt zone into the northern forested areas and beyond to the edge of the arctic. The writer has collected the species in the Quill Lakes area, at Melfort, Prince Albert, Waskesiu, and Lac la Ronge. It has been reported from Churchill as well as from southern Manitoba. Alberta records include Calgary, Red Deer, and Banff. There are specimens in the Hearle collection taken at Kamloops.

Aedes pullatus (Coquillett)

Fig. 39

Description

Antenna slender, curved, spined; tuft before the middle. Head hairs: upper multiple (6 - 8), lower usually three. Prothoracic hair formula 2 1 2 - 1 - 3 1 5. Lateral abdominal hairs triple on first segment, double on second to fifth, single on sixth. Comb of eighth segment of about 40 scales in a triangular patch, each scale long, evenly rounded apically by spines. Anal segment not ringed by the dorsal plate; ventral brush with two tufts preceding the barred area; gills long. Siphon 3 X 1; pecten of evenly spaced teeth on basal third; tuft large, near the middle.

Distribution

The writer has seen specimens collected by Hearle at Banff. According to Dyar the range of the species extends west of Banff into British Columbia, north through Yukon into Alaska, south as far as Colorado.

Aedes lateralis (Meigen)

Fig. 40

Description

Antenna small, nearly straight, indistinctly spined; tuft before the middle. Head hairs: upper double or single, lower single. Prothoracic hair formula 3 1 1 - 1 - 3 1 3. Lateral abdominal hairs double on segments one to six. Comb of eighth segment in a triangular patch of about 30 scales; each scale with several spines, the median slightly longer and broader than lateral ones. Anal segment not ringed by the dorsal plate. Siphon 2 X 1, gradually tapering; pecten of closely set teeth reaching just beyond the basal third of tube; tuft near the middle.

Distribution

Most distribution records of this species refer to *Aedes aldrichi* Dyar and Knab. However, the latter species is considered by Edwards to be synonymous with *A. lateralis* (Meigen). Ross, on the other hand, puts *aldrichi* with *hirsuteron* under *A. sticticus* (Meigen). The writer has followed Matheson in considering *aldrichi* as a synonym of *A. lateralis* (Meigen).

The above description applies to specimens collected at Banff by Hearle and identified by him as *A. aldrichi*.

Aedes aurifer (Coquillett)

Fig. 41

Description

Head rounded, almost as long as wide. Antenna long, as long as head, arched, broadened along basal two-thirds, pigmented and spined distally; tuft beyond middle. Head hairs: upper and lower in two, small tufts between upper hairs. Prothoracic hair formula 1 2 1 - 1 - 1 1 2. Lateral abdominal hairs double on segments one to five. Comb of eighth segment in an irregular double row; each scale with a median spine and lateral spinules. Anal segment not ringed by the dorsal plate, the latter with a deep emargination on the lower posterior angle. Siphon 3×1 , gradually tapering; pecten of closely set teeth, the last one detached, followed by a large tuft.

Distribution

In Western Canada this species is limited to southern Manitoba.

Aedes cyclocerculus Dyar

Fig. 42 (Redrawn from Dyar (2))

Description

The writer has no specimens. The description that follows is taken from Dyar.

Head rounded, bulging at the sides; antennae moderate, sparsely spined, with a tuft about the middle. Head hairs upper one to three, lower two to one, anteantennal tuft about six. Lateral comb of the eighth segment of six or seven scales in a row. Air tube three times as long as wide, pecten fine and even, not quite reaching the middle, followed by a five haired tuft. Anal segment ringed by the plate, short and quadrate, the ventral brush posterior. Dorsal tuft a long hair and brush on each side. The larvae are small and dark and occur gregariously in certain pools.

Distribution

Coast of British Columbia and Alaska within the barrier-island region.

Aedes triseriatus (Say)

Fig. 43 (Redrawn from Matheson (8))

Description

The writer has no specimens. The following description is adopted from Matheson.

Head rounded, about as long as wide. Antennal tuft a single hair, situated near the middle. Head hairs: upper long and single, lower short and triple, a pair of small multiple tufts between lower hairs. Prothoracic hair formula

3 1 1 - 3 - 3 1 3. Lateral abdominal hairs triple on first segment, double on segments two to six. Numerous secondary hairs and tufts. Comb on eighth segment in irregular row of about a dozen scales. Anal segment not ringed. Dorsal plate with a multiple tuft on the lower posterior angle. Siphon 3×1 , abruptly narrowed beyond pecten; pecten of closely set teeth, none detached, reaching the middle, followed by a tuft of one or two hairs.

Distribution

This is a tree-hole breeding mosquito which has also been reared from pitcher plants and artificial containers. According to Twinn (14) the distribution in Western Canada includes Saskatchewan and British Columbia.

Acknowledgments

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The Saskatchewan Research Council.

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Regina, Sask.

The University of Saskatchewan,
Saskatoon, Sask.

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The Systematic Unit,
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Ottawa.

The United States National Museum,
Washington, U.S.A.

The Dominion Livestock Insects Laboratory,
Kamloops, B.C.

Dr. Robert Matheson,
Cornell University,
Ithaca, N.Y.

Dr. Herbert H. Ross,
Illinois State Natural History Survey Division,
Urbana, Ill.

Graham Heid,
Los Angeles, Calif.

The map of Western Canada showing the main vegetation zones was adapted from "Forest Classification of Canada", by the Army Survey Establishment, Department of National Defence.

The writer wishes to express his sincere appreciation and thanks to the above.

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(Note : *Figs. 1-43 follow.*)

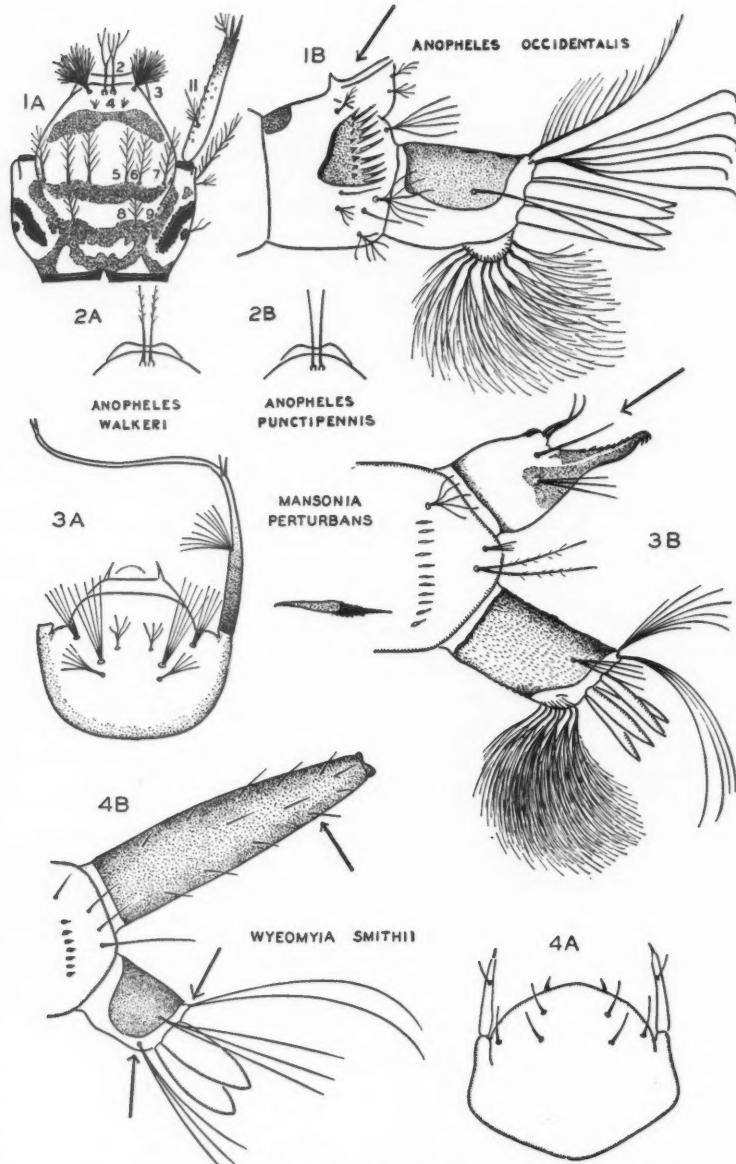
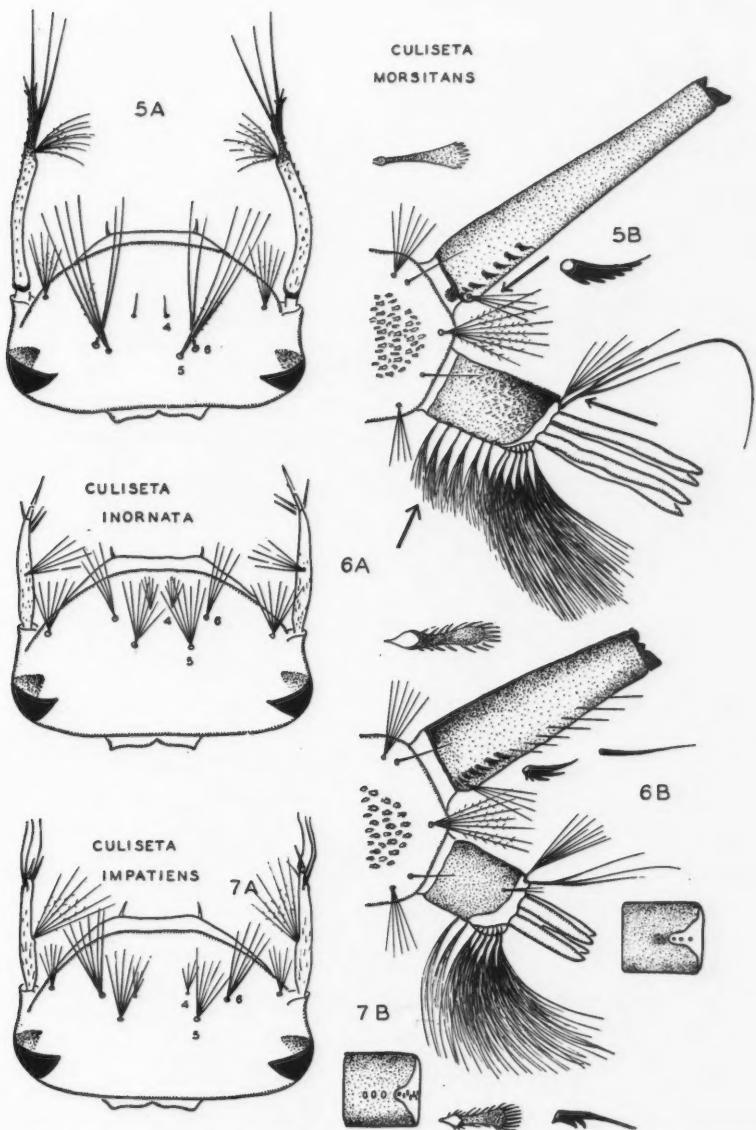
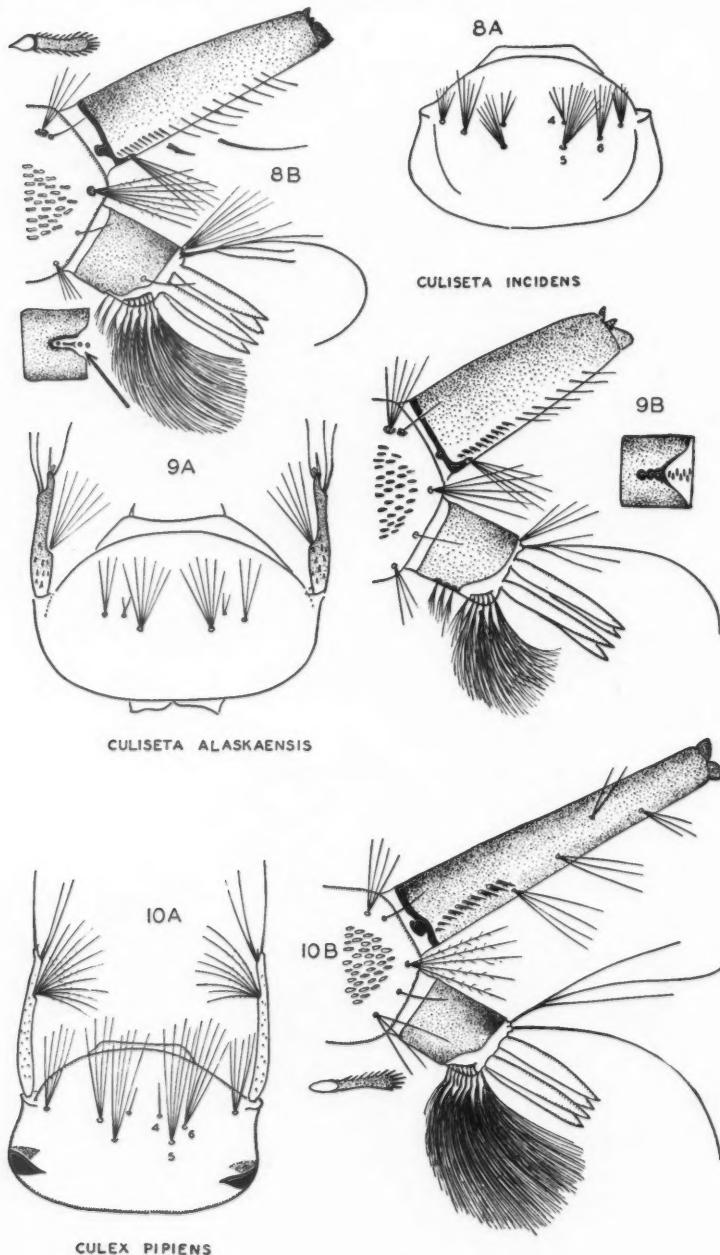


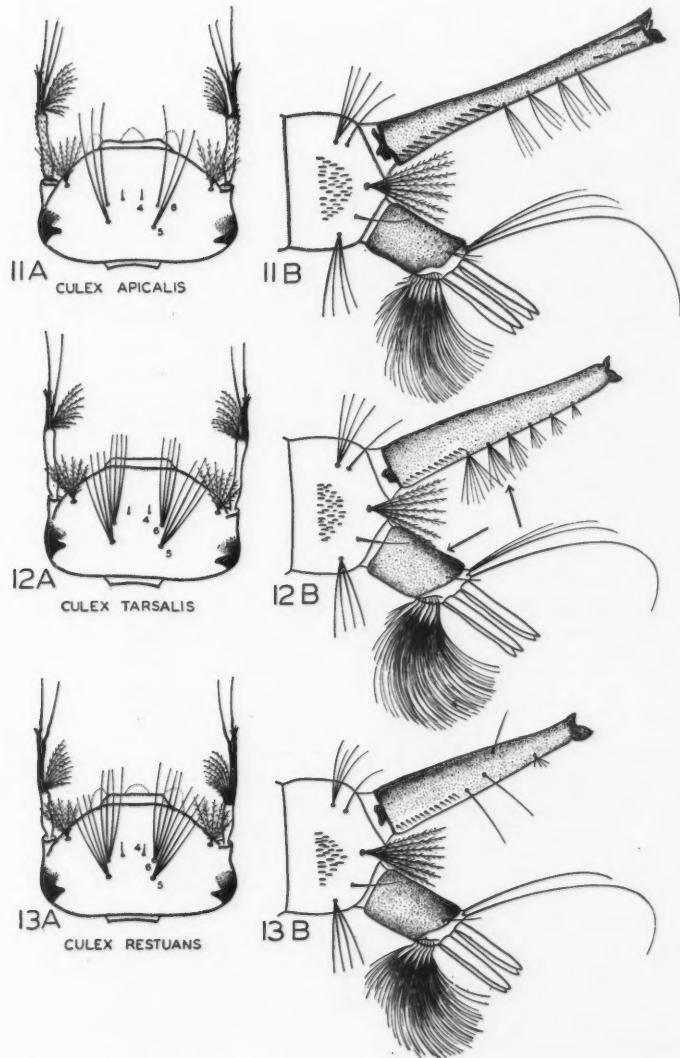
FIG. 1. *Anopheles occidentalis*. A, dorsum of head; B, terminal abdominal segments.
 FIG. 2A. *Anopheles walkeri*. Inner clypeal hairs.
 FIG. 2B. *Anopheles punctipennis*. Inner clypeal hairs.
 FIG. 3. *Mansonia perturbans*. A, dorsum of head; B, terminal abdominal segments.
 FIG. 4. *Wyeomyia smithii*. A, dorsum of head; B, terminal abdominal segments.
 (Redrawn from Ross.)



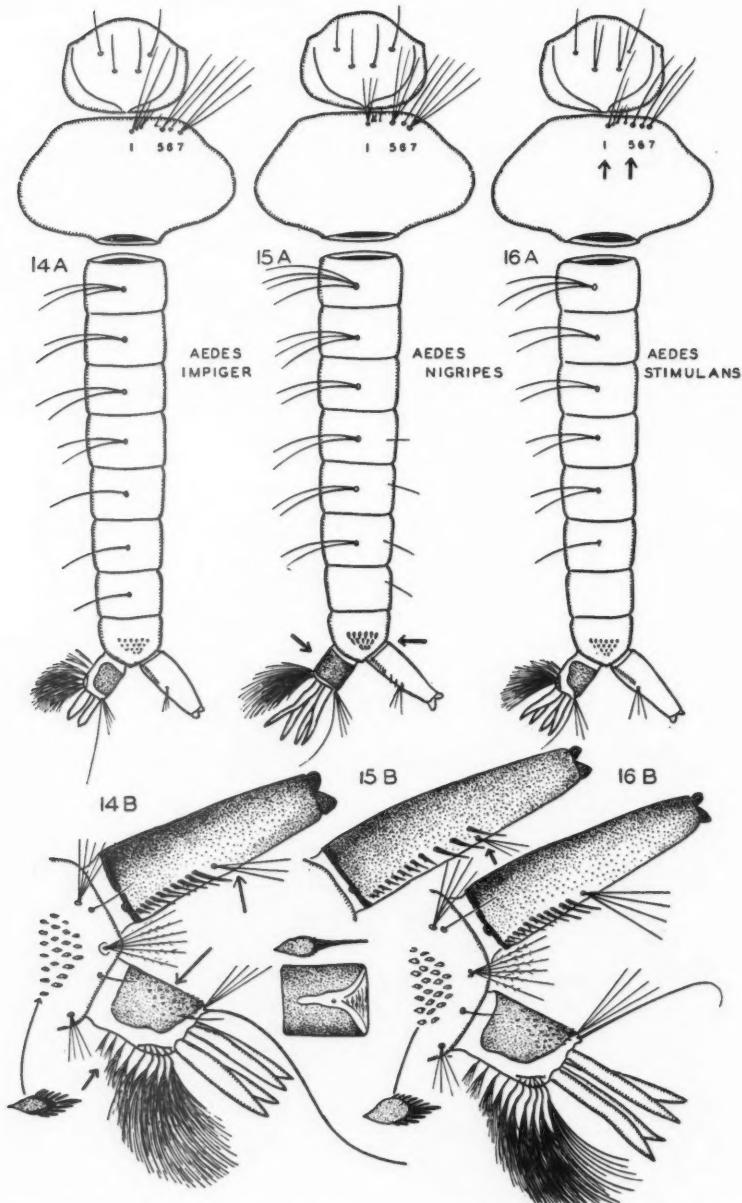
FIGS. 5-7. Larvae of *Culiseta*. A, dorsum of head; B, lateral aspect of terminal abdominal segments. Inset detail of pecten and comb scales and dorsal plate.



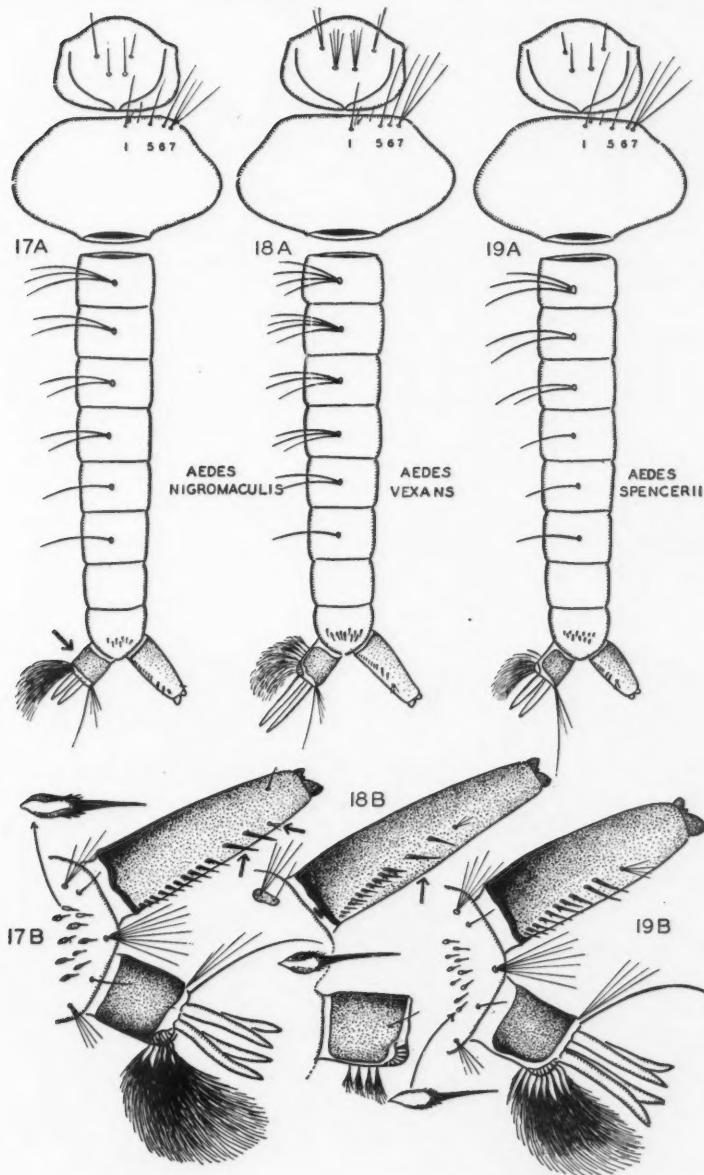
FIGS. 8-10. Larvae of *Culiseta* and *Culex*. A, dorsum of head; B, lateral aspect of terminal abdominal segments. Inset detail of pecten and comb scales and dorsal plate.



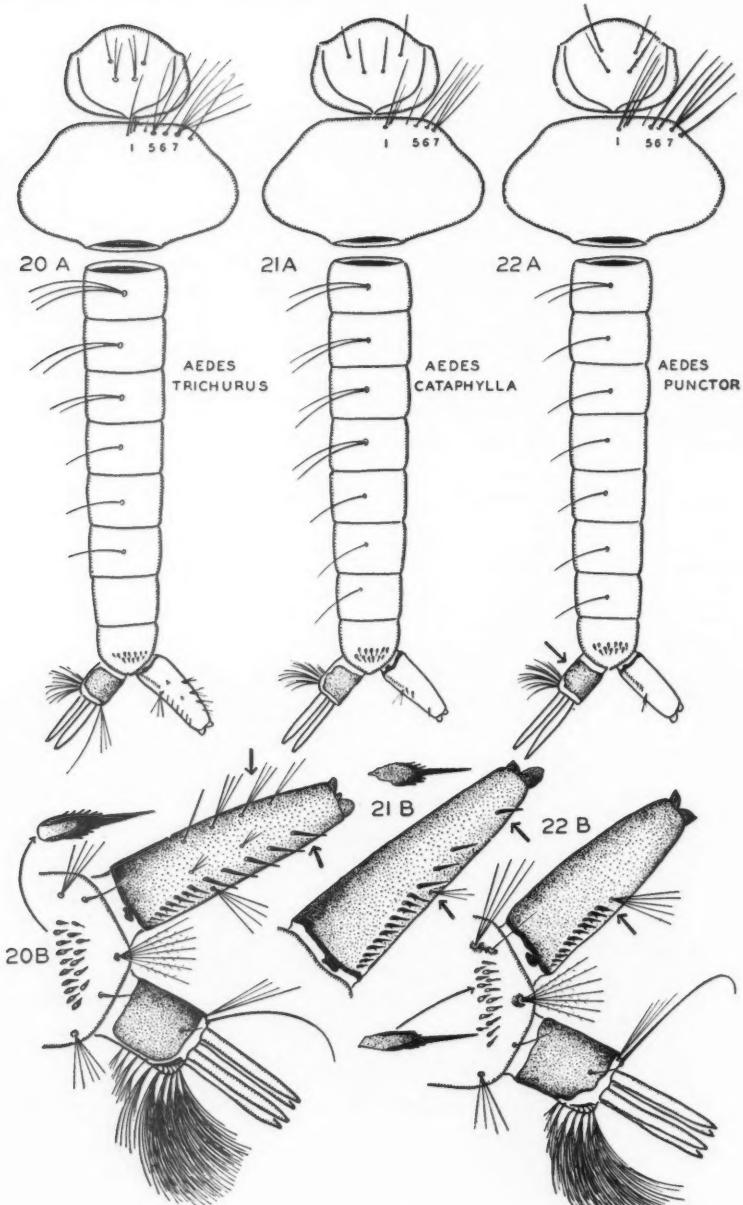
Figs. 11-13. Larvae of *Culex*. A, dorsum of head; B, lateral aspect of terminal abdominal segments.



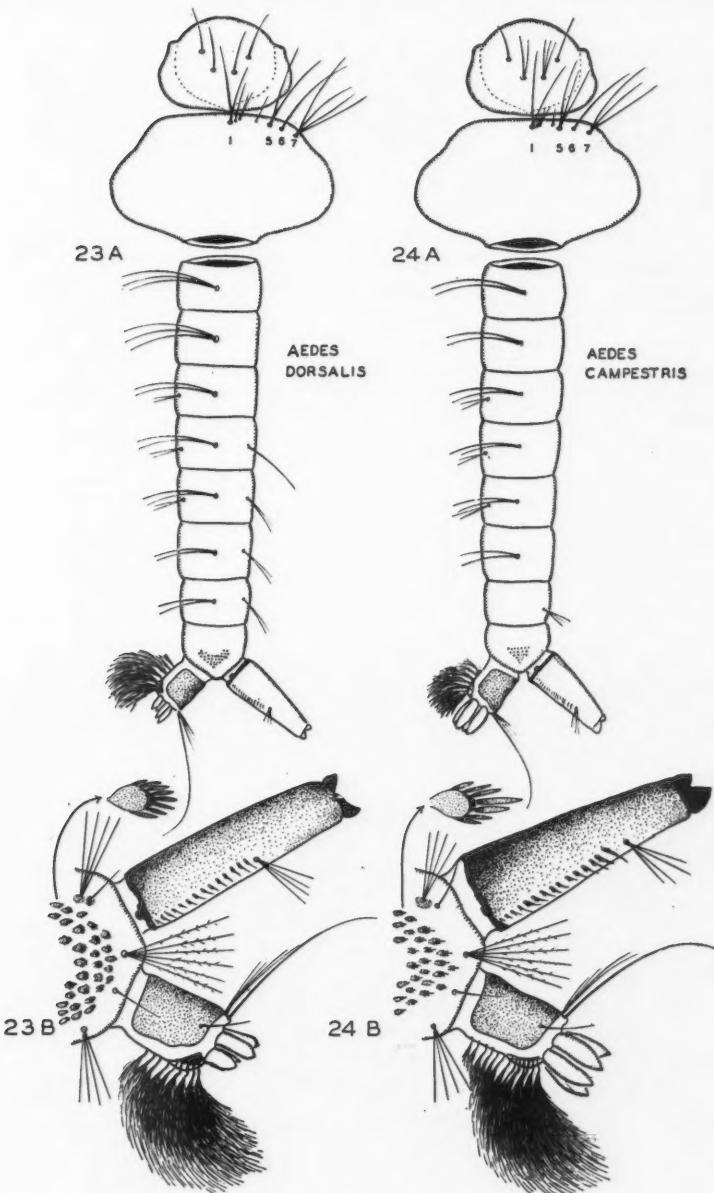
FIGS. 14-16. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen. B, terminal abdominal segments enlarged. Inset detail of comb scales.



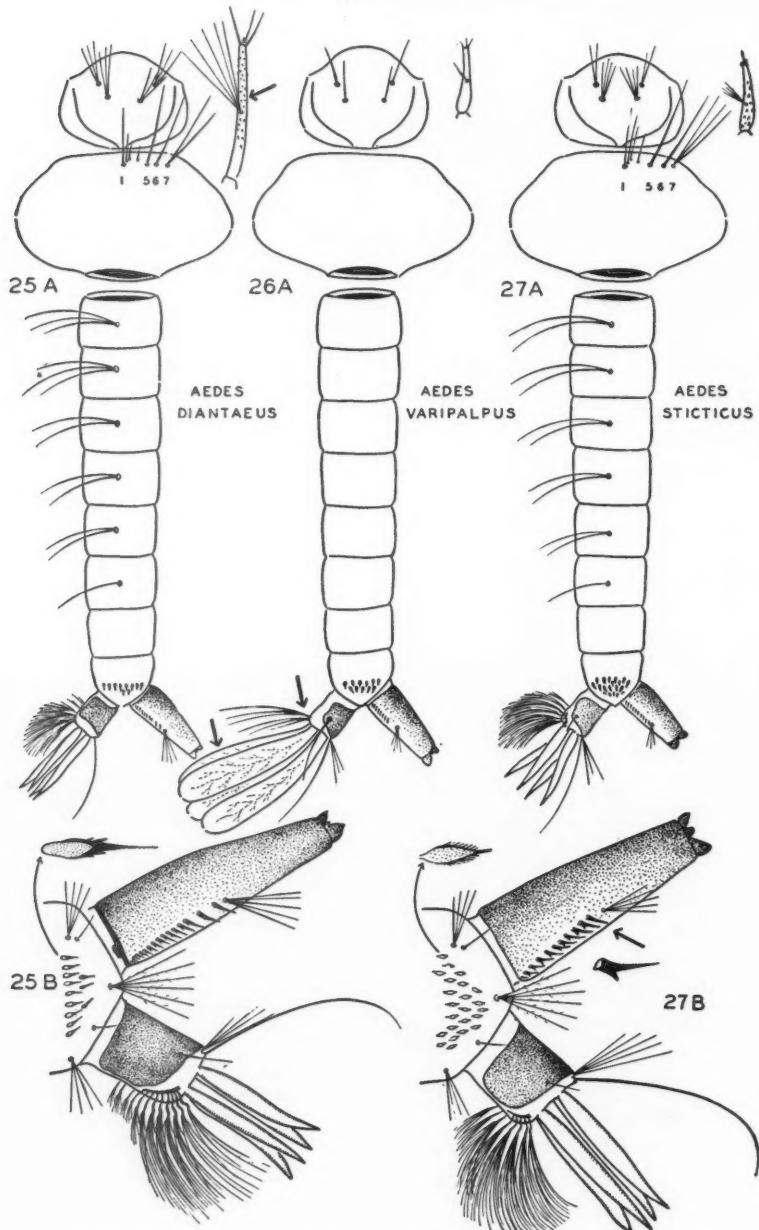
FIGS. 17-19. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



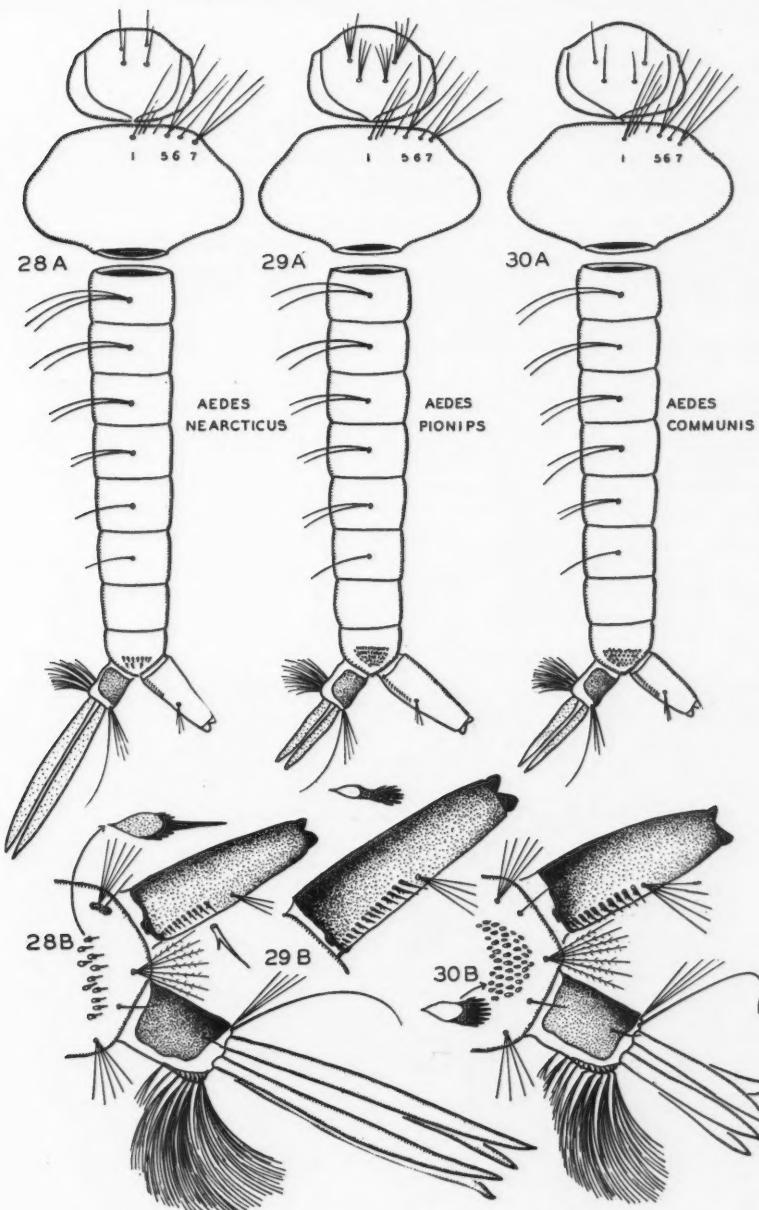
FIGS. 20-22. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



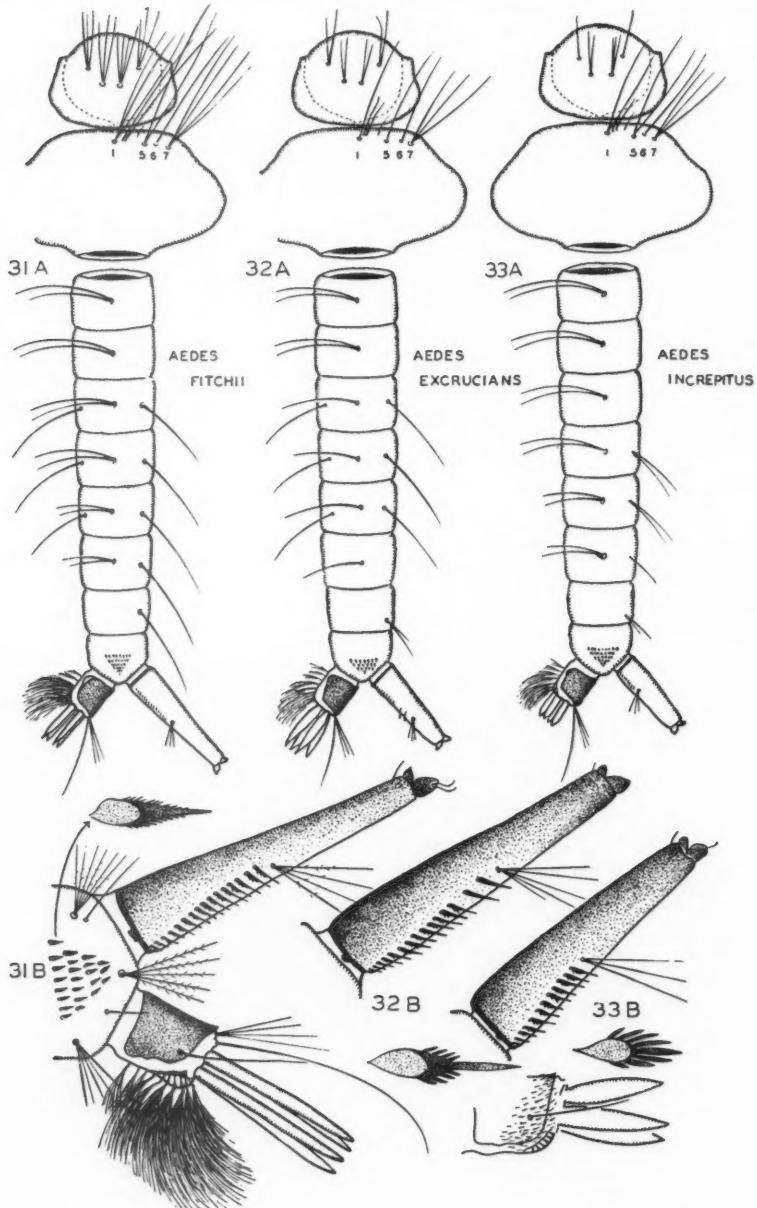
Figs. 23 AND 24. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



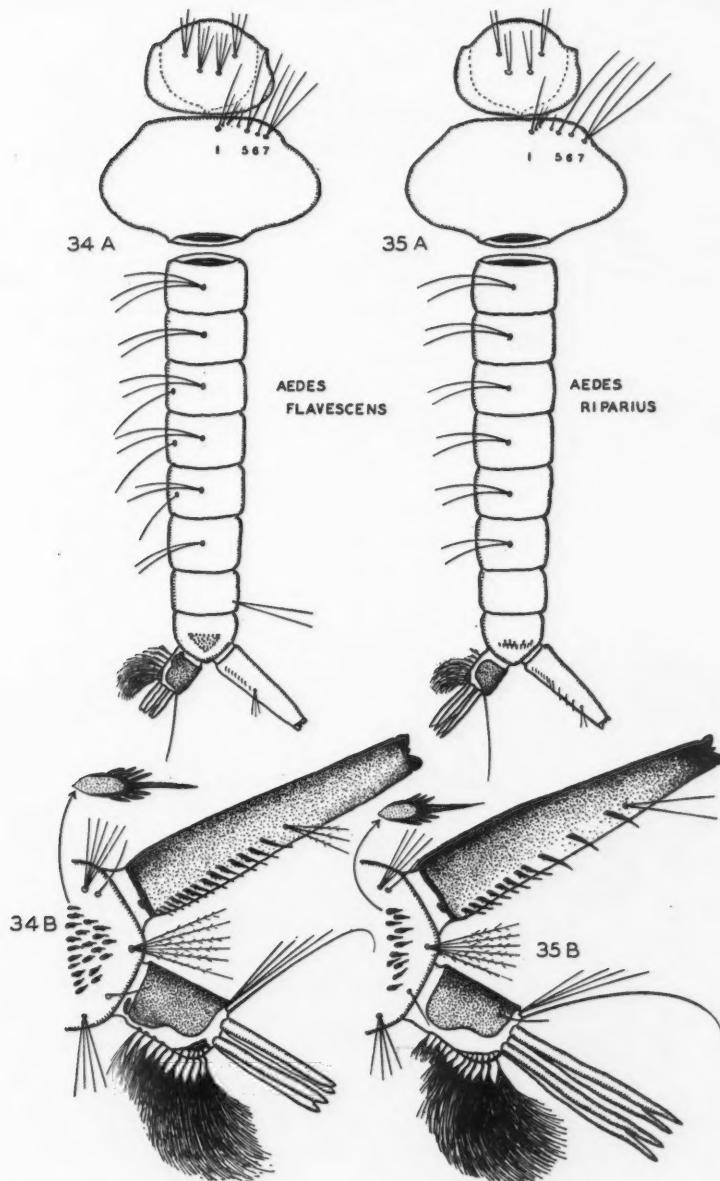
FIGS. 25-27. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of antennae and comb scales. Fig. 26 redrawn from Dyar.



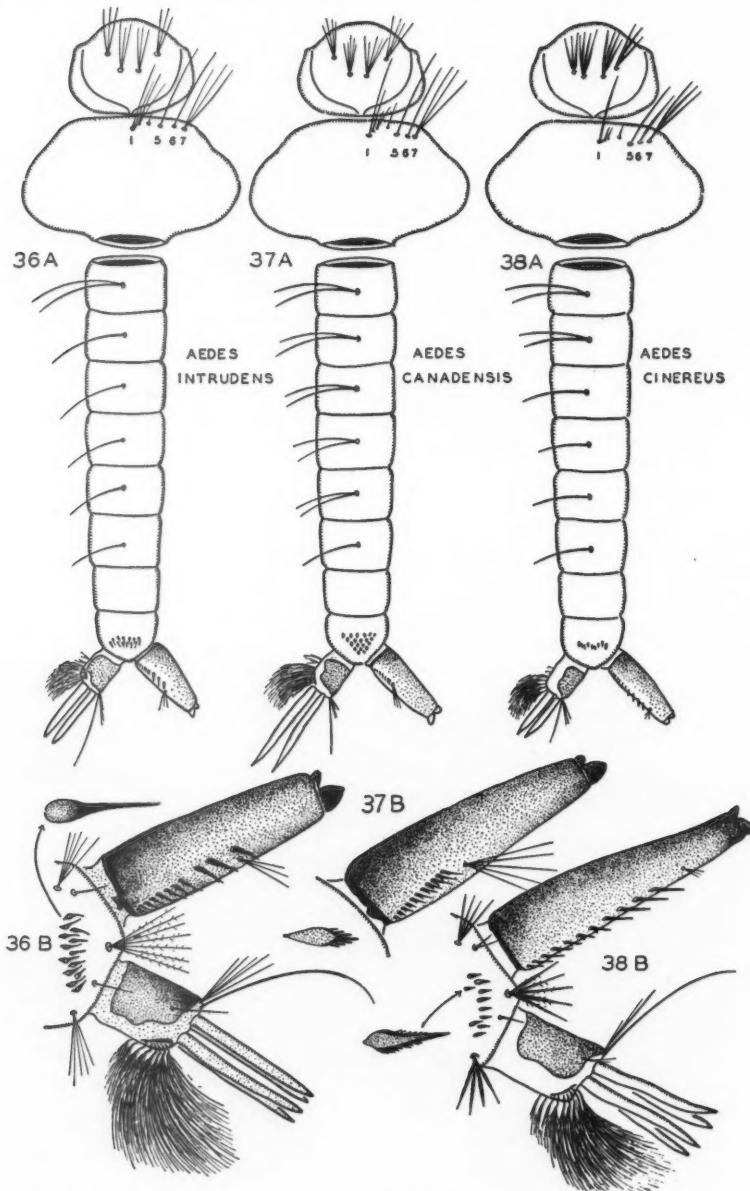
FIGS. 28-30. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



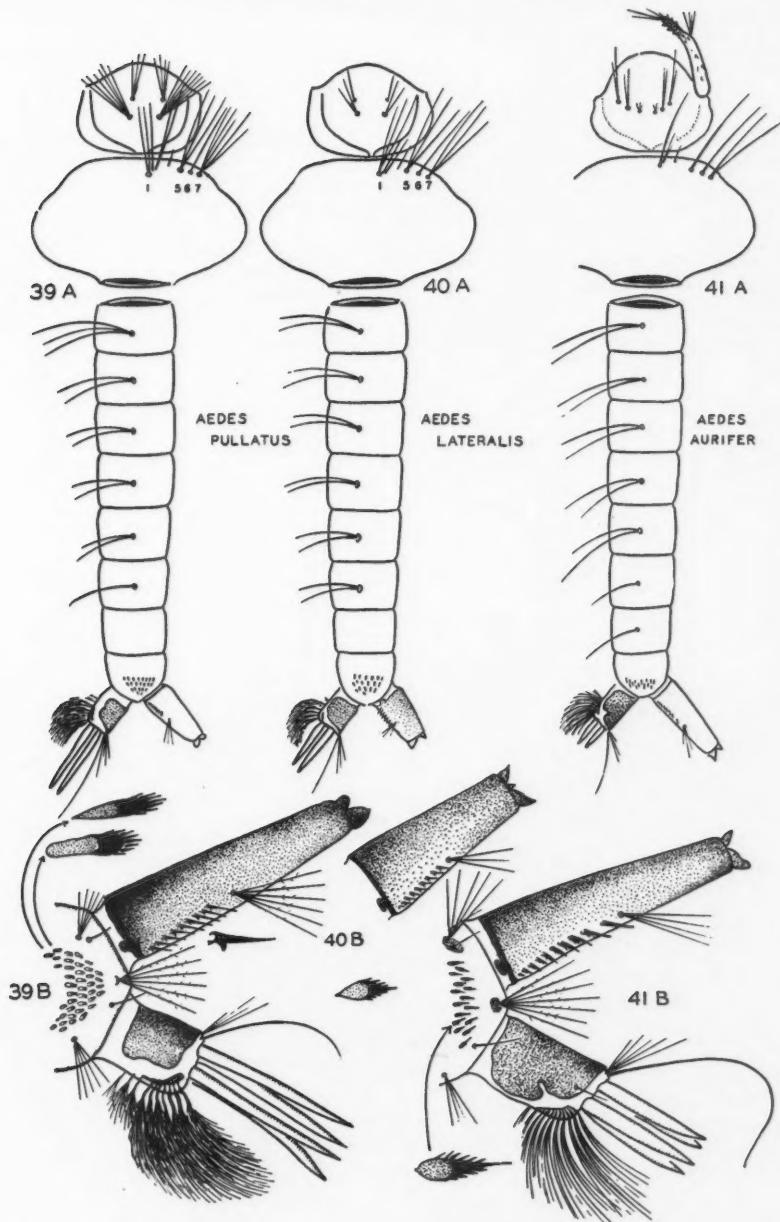
FIGS. 31-33. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



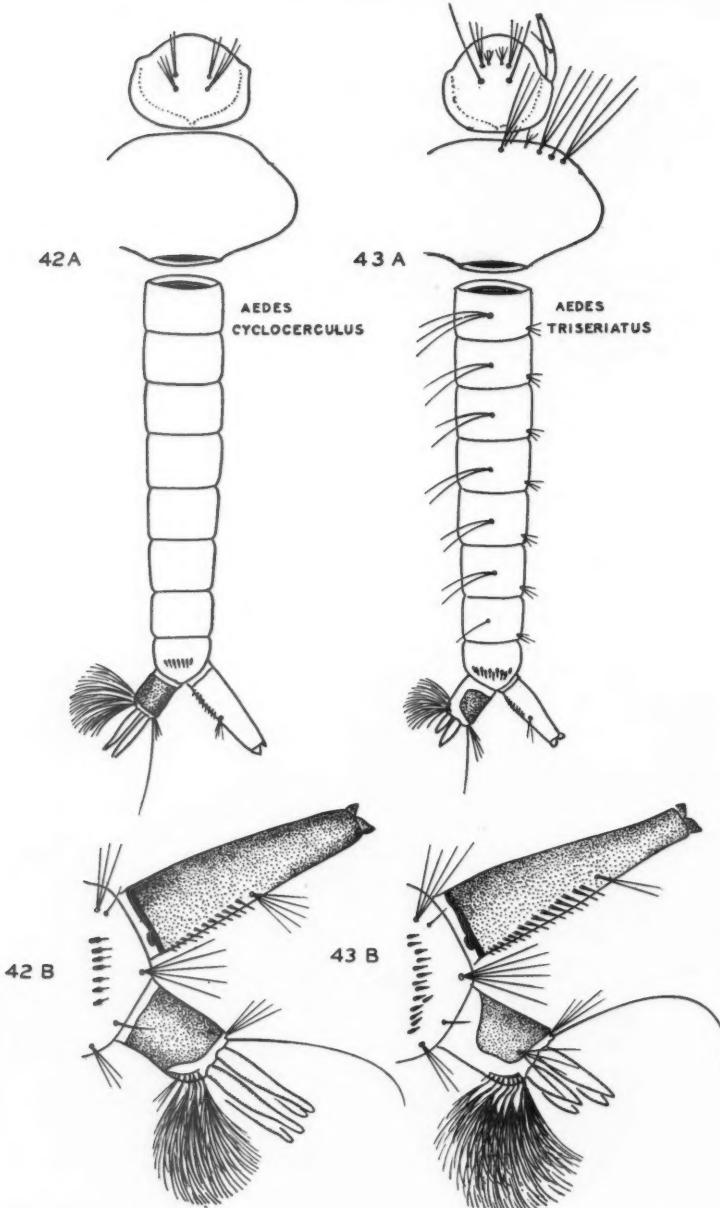
FIGS. 34 AND 35. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



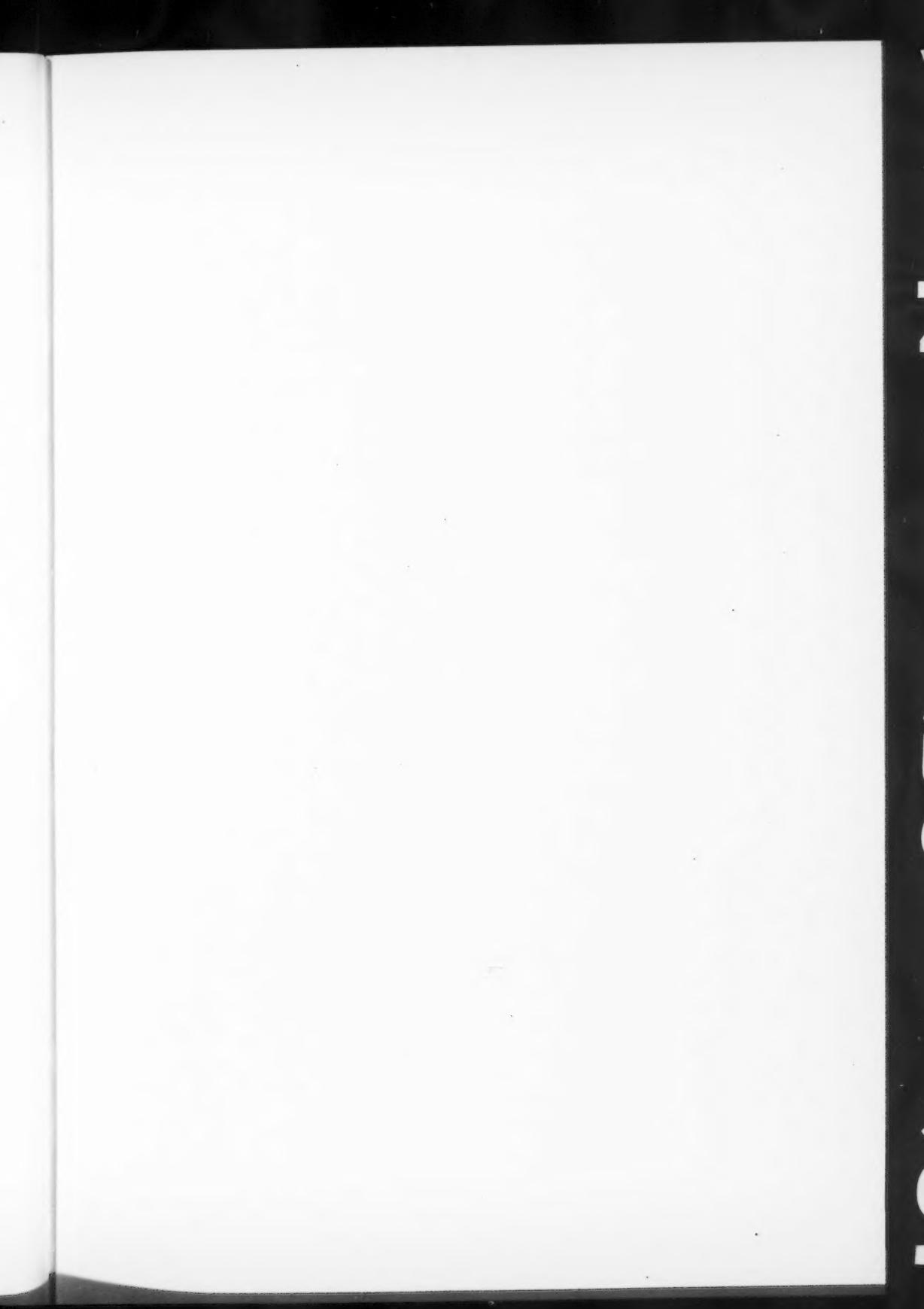
FIGS. 36-38. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.

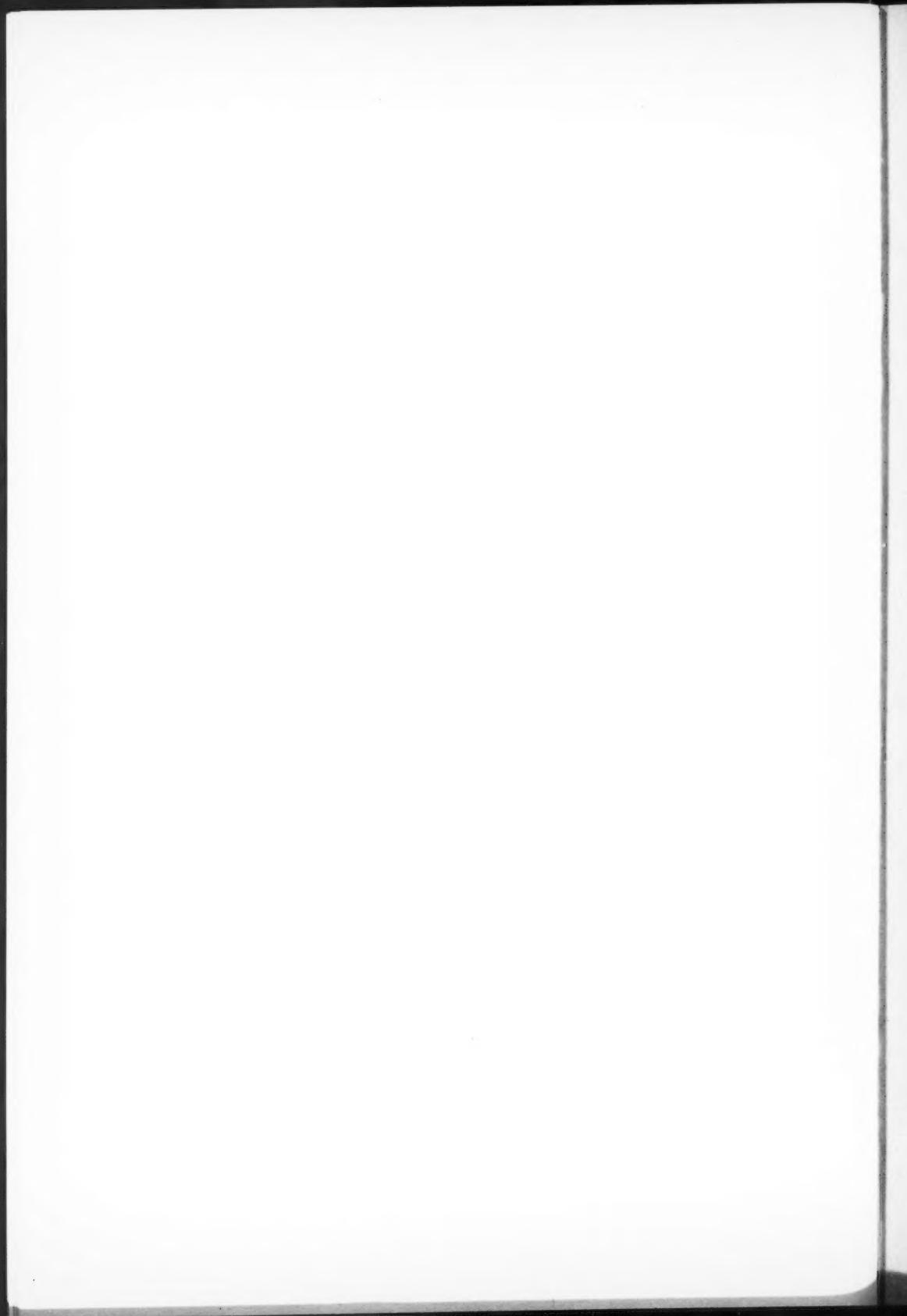


Figs. 39-41. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Inset detail of comb scales.



FIGS. 42 AND 43. Larvae of *Aedes*. A, dorsum of head and thorax, lateral aspect of abdomen; B, terminal abdominal segments enlarged. Fig. 42 redrawn from Dyar. Fig. 43 redrawn from Matheson.





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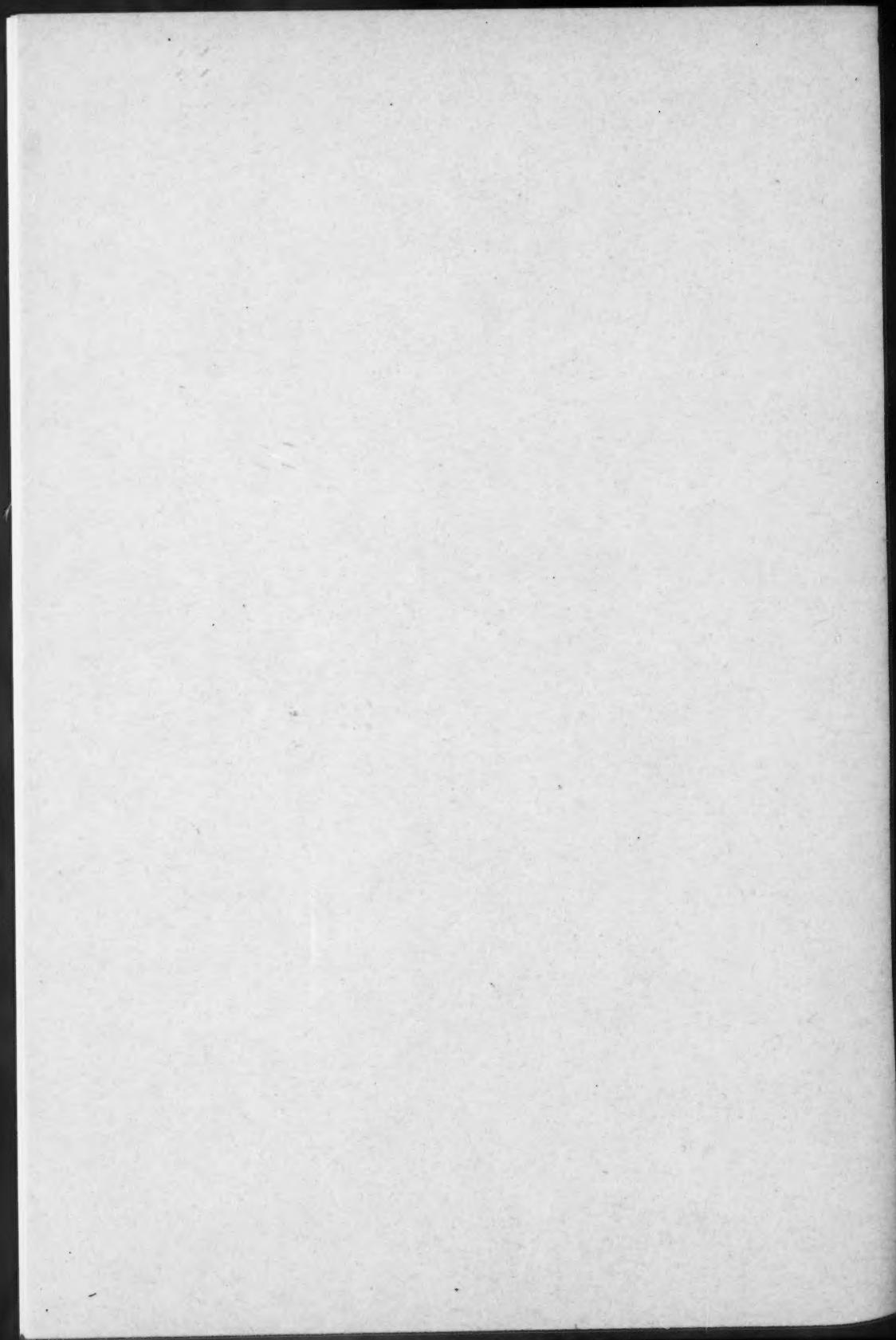
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